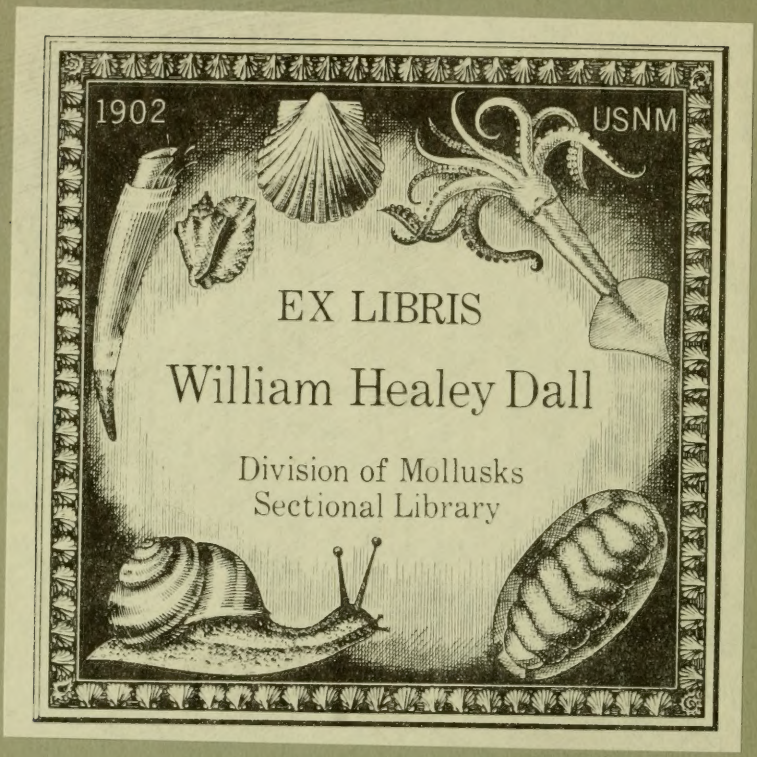
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JOHN BROOKS HENDERSON

II.—*Preliminary Catalogue of the Marine Mollusca of the Pacific Coast of Canada, with notes upon their distribution.*

By the Reverend George W. Taylor, F.Z.S.

(Read May 25, 1894.)

In the present paper I have not attempted anything more than is expressed in the title, namely a "Preliminary Catalogue" of the Marine Mollusca of our province.

The time when it will be possible to write an exhaustive history of our western shells has not yet come. Too little local collecting has been done. We who are resident within the province, and who have opportunity of examining the shells themselves, are unable to consult much of the necessary literature. On the other hand, naturalists more favourably situated with regard to books, and who have access to the great libraries, lack the advantage of possession of complete series of specimens.

Some day, let us hope, scientific literature will be more accessible to us in the far west and then perhaps we may be able to study our fauna thoroughly on the spot. In the meantime it is believed that a catalogue like the present, in which are brought together the results of the observations of the principal previous workers, will be of use to those who may, in the future, be led to take up the subject.

It is not claimed, of course, that even as a compilation this catalogue is free from error, but every care has been taken in verifying quotations and records, and it is hoped that no very serious blunders will have crept in.

A writer upon west American mollusca must almost of necessity take as his starting point the classic works of Dr. P. P. Carpenter.

When that distinguished conchologist presented his first report [1] to the British Association, hardly anything was known of the mollusca of the Vancouver province. Only about 85 species belonging to our fauna were noted as west American in that report, and nearly all of these were either Arctic or Southern Californian shells.

In the interval, however, between 1856 and the completion, in 1863, of Dr. Carpenter's second report [2] a vast amount of additional information was accumulated.

[1] "Report on the present state of our knowledge with regard to the mollusca of the west coast of North America," in the Report of the British Association for 1856, published in 1857.

[2] "Supplementary report on the present state of our knowledge with regard to the mollusca of the west coast of North America," in the Report of the British Association for 1863, published in August, 1864.

The naturalists attached to the British and United States Boundary Commissions made large collections of marine shells in Puget Sound and on the shores of Vancouver Island.

Fourteen species, supposed to be new to science, were obtained by Mr. J K. Lord, of the British expedition, and were described in the Proceedings of the Zoological Society of London (for 1863) by Dr. W. Baird, who at the same time, and in the same publication, described two other species *Leda fossa* and *Nucula Lyalli* which had been dredged in Esquimalt Harbour by Dr. Lyall, of H. M. S. Plumper.

The shells collected by Dr. Kennerley, naturalist to the American Commission, were not described until two years later, the delay being in great part due to the death of Dr. Kennerley almost immediately after his return from the expedition. Dr. Kennerley's shells were collected principally in Puget Sound, and are catalogued, and the new species indicated by Dr. Carpenter in his second report. The new species, some 25 in number, were fully described in the Proceedings of the Academy of Natural Sciences (Philadelphia) for 1865. More than seventy species were added to the Vancouver fauna from this collection.

A third very important collection from our waters, examined by Dr. Carpenter and fully reported on by him in the "Supplementary Report" above referred to, was made by Mr. (now judge) J. G. Swan with the help of Indians at Neeah Bay, and other points on Puget Sound, and the neighbouring British Columbian coasts. From this collection about 50 species not noticed by either Lord or Kennerley were added to our list, about 20 of these being new to science.

The species contained in these three collections are arranged in systematic order in columns 5, 6 and 7 of the table of species appearing on pages 636 to 664 of Carpenter's 1863 report, and form the "Vancouver" list of thirty years ago.

The number of species named in this list is as follows :

In column 6. Lord's collection, number of names	79	
Deduct varieties, etc	3	
		76
In column 5. Kennerley's collection, additional names	81	
Deduct varieties, synonyms, etc	8	
		73
In column 7. Swan's collection, additions	71	
Less varieties and synonyms	20	
		51
Total		200

Dr. Carpenter also quotes from Vancouver Island on other authority the following species: *Glycimeris generosa*, *Chrysodomus liratus* and *Ischnochiton interstinctus*, thus raising the total to 203.

Many of these species were only known, in Carpenter's time, from Puget Sound (that is to say *United States*) localities, but as nearly all of them have already been found to occur in British Columbian waters also, we take it for granted that the others will all eventually be found within our limits.

In the present paper 284 marine species are noted as follows:

	In Carpenter's List	Since Added	Total.
Brachiopoda	4	1	5
Pelecypoda	79	31	110
Scaphopoda	2	1	3
Gasteropoda—			
Pteropoda	1	0	1
Opisthobranchiata	3	4	7
Nudibranchiata	0	0	0
Pulmonata	1	0	1
Ctenobranchiata	94	39	133
Polyplacophora	17	4	21
Cephalopoda	2	1	3
	203	81	284

If we add our 67 land and fresh water species we have a total of 351 as being the number of British Columbian mollusca at present known.

Of the 81 additions to the list since 1864, more than one-half will be found recorded in the four papers, by Mr. J. F. Whiteaves, which must now be considered.

The first of these is an account of a collection made by Mr. J. Richardson of the Geological Survey of Canada on the east coast of Vancouver Island in 1874-75. It is entitled "On some Marine Invertebrata from the west coast of North America" and it was published in the 'Canadian Naturalist,' vol. viii., N. S. No. 8, December, 1878.

Eleven species are herein added to our list, one of them "*Cardium Richardsoni*" being described as new to science. This shell has, however, turned out to be equivalent to Carpenter's *C. centifilosum*. The other additions are:

Megerlia Jeffreysi, *Modiolaria nigra*, *Serripes Laperousii*, *Kennerlia grandis*, *Pholadidea ovoidea*, *Surcula perversa*, *Buccinum polare*, *Trophon tenuisculptus*, *Trophon muriciformis* (= Dallii) and "*Margarita Vahlii*." This last shell, which I have seen in the Geological Museum, Ottawa, is a specimen of the *Solariella varicosa* of Mighels and Adams, but though wrongly identified by Mr. Whiteaves, is none the less an addition to our list.

Mr. Whiteaves's second paper is a more elaborate one. It is "On some Marine Invertebrata from the Queen Charlotte Islands" and forms an appendix (C) to the report of Dr. G. M. Dawson on his explorations

in the Queen Charlotte Islands in 1878. The paper is published in the Report of Progress of the Geological Survey of Canada for 1878-79.

Dr. Dawson took home quite a large collection of shells of about 135 species, no fewer than 22 being additions to the list, and 2 of these new to science.

The new species are :—*Macoma carlottensis* and *Lepton rude*, and the other additions are :—*Bryophila setosa*, *Crenella decussata*, *Leda cælata* (= acuta) *Astarte undata*, *Cryptodon flexuosus*, *Lucina filosa* (= acutilineata) *Macoma sabulosa* (= lata) *Bela Trevelyana*, *Mitromorpha filosa*, *Mangilia sculpturata*, *Volutella pyriformis*, *Chrysodomus Harfordi*, *Odostomia Sitkensis*, *Odostomia straminea*, *Cœcum crebricinctum*, *Lamellaria Stearnsii*, "*Fenella*" *pupoidea*, "*Fissurella*" *bimaculata*, *Tonicella marmorea* and *Chætopleura Hartwegii*.

Some of the shells noted in this paper seem to have been incorrectly determined. A few corrections have been made by Mr. Whiteaves himself in subsequent papers as follows :—

Moera variegata,	should be	*M. salmonea.*
Astarte semisulcata,	"	*A. undata.*
Leda cælata,	"	*L. acuta.*
Chlorostoma brunneum,	"	*P. pulligo.*
Galerus contortus,	"	*G. fastigiatus.*

The following additional corrections, to which I think Mr. Whiteaves will assent, are also needed :

Turtonia minuta.—The shell, in the Ottawa Museum, is a large specimen of *Tellimya tumida.*

Cylichna alba.—This is *C. attonsa.*

Amphissa versicolor.—Merely a small form of *A. corrugata.*

A third paper by the same author was published in the Transactions of this Society (vol. iii., section iv., 1886). It is an account of the Invertebrata obtained by Dr. Dawson, principally by dredging, off the northern and northwestern coasts of Vancouver Island in 1885.

One hundred and forty-seven species of mollusca are noted, fourteen being new to the fauna and two, so it was thought at the time, new to science.

The supposed new species are : *Cadulus aberrans* which still stands, and *Leptochiton punctatus* the type of which appears to be a very pale form of *Ischnochiton retiporosus.*

The other additions to the list are : *Pecten Vancouverensis* (recorded as "Alaskensis"), *Limatula subauriculata*, *Yoldia thraciæformis*, *Bela violacea*, *Cancellaria circumcincta*, *Admete viridula* (= Couthouyi) *Sipho* (misprinted *Siphon*) *Verkruzeni*, *Trophon Stuarti* (recorded as *orpheus*)

Eulima incurva, Barleeia haliotiphila (recorded as *subtenuis*) *Solariella peramabilis, Lepidopleurus cancellatus* and *Ommastrephes sagittatus.*

A few corrections may be made :

Pecten Alaskensis.—This specimen is the type of *P. Vancouverensis* since described by Mr. Whiteaves as a new species.

Cylichna alba.—Is again recorded, but the specimens, which I have seen, are undoubtedly *C. attonsa* of Gould.

Leptochiton punctatus.—A pale specimen of *Ischnochiton retiporosus.*

Barleeia subtenuis.—These are *B. haliotiphila. B. subtenuis* is southern and a much larger shell.

Trophon orpheus.—These are fine specimens of *Trophon Stuarti*, a perfectly distinct species which has been placed in the synonymy of *T. orpheus* by several conchologists who have probably not had the opportunity of examining many specimens.

In Mr. Whiteaves's fourth paper[1] he describes and figures *Pecten Vancouverensis* n.sp., and puts on record two additions to our list,—*Cumingia Californica*, a southern shell, and *Emarginula crassa*, a rather remarkable discovery, as there is not, I believe, any other record of the occurrence of the species in the Pacific Ocean.

It will be seen that in these four important contributions to our knowledge no fewer than forty-nine species are added to Carpenter's list.

The efforts of other collectors during the past few years have resulted in a further addition of 32 names, and there is little doubt but that there are still many more species inhabiting our waters to be one day discovered by the enthusiastic conchologist.

The local collections to which I shall refer in the present paper have been made by Dr. C. F. Newcombe, Professor Macoun and myself. Dr. Newcombe has collected diligently and successfully in the neighbourhood of Victoria ; at Comox, 140 miles north of Victoria ; at Clayoquot Sound on the west coast of Vancouver Island ; and in some other localities. The results of his work appear in a "Report on the Marine Shells of British Columbia," which was published in February last in the 'Bulletin of the Natural History Society of British Columbia.' This report contains a large amount of information on the distribution of our mollusca and has indeed almost rendered the present paper unnecessary.

Professor Macoun collected last year (1893) at Comox, Nanaimo and Sooke with much success. In July last, I had the pleasure of joining the professor in a day's dredging in Departure Bay. Using a home-made dredge from an ordinary sailing boat manned by three

[1] "Notes on some Marine Invertebrata from the coast of British Columbia," Ottawa Naturalist, vol. vii., no. 9, p. 133 (December, 1893).

men, we secured more than 7,000 specimens of 88 species of mollusca, including one species, *Rictaxis punctocælata*, that I had not before observed in this province.

I had myself collected on a previous occasion in the same locality; and during a number of years I have dredged and made shore collections near Victoria; and at Vesuvius Bay and Ganges Harbour, on Salt Spring Island; and at Comox. I have not so far had any opportunity of personally visiting more northern or west coast localities.

In the notes that follow, I have endeavoured to give under each species, a reference to the original description and figure; secondly, such synonyms as appear necessary to connect this list with previous papers on the same subject, likely to be consulted by the student; thirdly, a list of the localities, within the province, in which the shell has been found; and lastly, some brief notes as to its station, relative abundance, and so forth.

The determination of the shells themselves may be accepted, I think, as fairly accurate. I have had opportunities of studying the large collections in the Museum of the Geological Survey in Ottawa, and also the Vancouver shells in the Natural History Museum at South Kensington. Moreover, most of the difficult species have been submitted at different times to Dr. Dall, who has most kindly helped me, during several years past, in identifying puzzling specimens.

In the arrangement of the species I have endeavoured to follow, as nearly as I could, the classification adopted by Dr. Dall in his most useful catalogue of the shells of the Atlantic coast of the United States, published in 1889, as Bulletin 37 of the U. S. National Museum.

No attempt has been made to give a complete bibliography of the subject, but the titles of a number of the most useful papers are given in full in the following notes. Other useful papers, to which it is not possible to refer at length here, have been contributed by Drs. Cooper, Dall, Stearns and Pilsbry to the American Journal of Conchology and the Proceedings of the Academy of Natural Sciences (Philadelphia) the California Academy of Sciences and the United States National Museum.

CATALOGUE OF SPECIES, WITH NOTES.

BRACHIOPODA.

The recent *Brachiopoda*, and especially the American species, have been well worked up by Dr. Dall. To his numerous papers on the subject in the American Journal of Conchology (vols. vi. and vii.) and in the Proceedings of the Academy of Natural Sciences of Philadelphia, the student is referred for extended notices of our British Columbian forms.[1]

TEREBRATULINA, D'Orbigny.

1. TEREBRATULINA UNGUICULA, Carpenter, sp.

Terebratula unguicula, Cpr., Rept. Brit. Assoc., 1863, p. 636 (Aug., 1864); and Proc. Zool. Soc. London, 1865, p. 201, fig. 1-4.

This species is now generally considered to be only a variety of *T. caput-serpentis*, Linne, sp. (*Anomia caput-serpentis*, Linn., Syst. Nat., ed. xii., vol. i., pt. 2, p. 1153, no. 236, 1767) which is, of course, the older name. Our species or variety was first described as from "San Diego 6 fms., Monterey, not rare in 20 fms. Cooper, Neeah Bay (valve) Swan, Vancouver, Forbes." It is not rare at Victoria and Departure Bay and has been dredged by Dr. Dawson in the Straits of Georgia, Discovery Passage, Johnston Strait and Forward Bay. Probably it will be found to occur throughout the province. Generally specimens are found attached to stones or dead shells dredged in from 1 to 100 fathoms, but on one occasion I obtained a fine series attached to the hairy epidermis of a living specimen of *Tritonium Oregonense*. Dr. Dall states that specimens from deep water are generally larger than those from near low water mark.

TEREBRATELLA, D'Orbigny.

2. TEREBRATELLA TRANSVERSA, Sowerby, sp.

Terebratula transversa, Sby., Proc. Zool. Soc. London, 1846, p. 94; and Thes. Conch., vol. I., p. 261, pl. 72, fig. 114-115 (1846) = *Terebratula caurina*, Gould, Proc. Bost. Soc. Nat. Hist., vol. iii., p. 347 (December, 1850); and U. S. Expl. Exped., p. 468, figs. 582-582c (1852).

This is an extremely common shell with us. It occurs in two distinct forms—a smooth deep-water form, which is the typical *transversa*, and a highly sculptured form occurring in thousands between tides, and

[1] Descriptions of all our species are contained in Dall's "Report on the Brachiopoda of Alaska and the adjacent shores of Northwest America." Proc. Acad. Sci. Phil., 1877, p. 155 et seq.

to which Gould's name, *caurina*, more strictly applies. The shore variety sometimes attains a very large size, one mentioned by Dall measuring 58 × 50 × 31 mm. I have specimens from Salt Spring Island and Departure Bay nearly as large.

LAQUEUS, Dall.

3. Laqueus Californicus, Koch, sp.

Terebratula Californica, Koch, Kuster's Martini, vol. viii., pl. xxvi., figs. 21-23.

This is not a common shell in any locality. Dall quotes its range as from Port Etches to Catalina Island, California, and remarks that it is everywhere rare, owing to its deep-water habitat. It is sometimes, however, found in comparatively shallow water, as at Victoria, where Mr. Richardson, Dr. Newcombe and myself have all dredged it. It has also been taken within the province by Dr. Dawson, in Discovery Passage and Johnston Strait and at the Queen Charlotte Islands.

British Columbian specimens are said to be smaller than Californian ones, and have received from Dr. Davidson, in his latest work,[1] the varietal name of *Vancouverensis*.

MEGERLIA, King.

4. Megerlia Jeffreysi, Dall.

Ismenia (?) Jeffreysi, Dall, Amer. Journ. Conch., vol. vii., p. 65, pl. xi., fig. 7-10 (March, 1871).

The only specimen that I have heard of as having been taken in British Columbia is the single dead shell obtained by Mr. J. Richardson at Victoria in 1875.

HEMITHYRIS, D'Orbigny.

5. Hemithyris psittacea, Gmelin, sp.

Anomia psittacea, Gmelin, Syst. Nat., ed. xiii., vol. i., pt. vi., p. 3348 (1788).

This is a common and well-known circumpolar shell, which on the west American coasts seems to reach its southern limit at the Straits of Fuca.

Though not so abundant in British Columbia as *T. transversa* or *T. unguicula*, it has been met with at Victoria by Mr. Richardson, Dr. Newcombe and myself, and at Discovery Passage and Johnston Strait by Dr. Dawson.

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[1] "Monograph of Recent Brachiopoda," Trans. Linn. Soc. London, vol. iv., 1886-87.

PELECYPODA.

OSTREA, Linne.

6. Ostrea lurida, Cpr.

Suppl. Rept. Brit. Assoc., 1863, p. 645 (Aug., 1864); and Journ. de Conch., vol. xii., p. 137 (April, 1865).

Common on all the coasts of British Columbia, northward to Queen Charlotte Sound. Dr. Dawson found specimens at Malaspina Inlet and also (abundantly) at Bradley Lagoon, Blunden Harbour, Queen Charlotte Sound, on the mainland side. This last locality is said by Mr. Whiteaves (Trans. Roy. Soc. Can. iv., iv., 118) to be the most northerly locality on record for the species in British Columbia.

7. Ostrea Virginica, Gmelin.

Syst. Nat., ed. xiii., vol. i., p. 3336, no. 113 (1788).

This species was introduced into the "Victoria Arm" some years ago, and has become to a certain extent naturalized. Prof. Macoun last summer (1893) found a finely grown adult specimen some little distance from the mouth of the Colquitz River, which flows into the Victoria Arm.

PLACUNANOMIA, Broderip.

8. Placunanomia macroschisma, Deshayes, sp.

Anomia macroschisma, Desh., Rev. Zool. Soc. Cuv., p. 359 (Dec., 1839); Mag. de Zool. (Guerin's) 1841, pl. xxxiv.

Very common everywhere between tides, and found also, but less frequently, in deeper water.

My finest specimens are from the rocks at Vesuvius Bay, Salt Spring Island. Very curious forms occur in the burrows of *Penitella*.

PECTEN, Müller.

9. Pecten caurinus, Gould.

Proc. Bost. Soc. Nat. Hist., vol. iii., p. 345 (Dec., 1850); and U. S. Expl. Exped., Mollusca, p. 458, fig. 569-569b (1852).

Not very common. This species was not found by Dr. Dawson either at the Queen Charlotte Islands or at the north of Vancouver Island.

The specimens I have seen have nearly all been from the neighbourhood of Comox, where Richardson dredged it in 1874, and where Dr. Newcombe has since taken it.

I have myself dredged this species living, but only on one occasion, near Victoria.

10. Pecten hastatus, Sby.

Thes. Conch., vol. i., p. 72, pl. xx., fig. 236, = *hericius*, Gould.

Common, and in some places very abundant, on both the east and west coasts of Vancouver Island. Varieties are pink, yellow, and very rarely pure white. This shell is usually dredged in 10 or 20 fathoms, but may sometimes be found living on rocks between tides. On one occasion I dredged, in the course of a few hours, more than five hundred specimens of this species ; this was in the straits about one mile from Victoria.

Many specimens are found covered with a sponge, *Myxitis parasitica*, Lambe. This sponge when living is of a bright yellow colour, and the Pectens so covered, as they are taken from the dredge, have the appearance of small oranges.

Dr. Dawson found a valve of *P. hastatus* with a specimen of *Bivonia compacta* attached. I believe, however, that the *Bivonia* is more usually found on a gasteropod—*Pachypoma inæquale*.

11. Pecten rubidus, Hinds.

Zool. Voy. Sulph., vol. ii., p. 61, pl. xvii., fig. 5 (1844).

This is usually considered to be a variety of the last species, and perhaps it may be so.

It is not rare near Victoria, occurring with *P. hastatus*, but in this locality it is always readily separable from that species and does not show any intermediate forms. The sculpture is not nearly so rough as in *P. hastatus*, the ribs are equal and more numerous, the shape is rounder, and the colours duller.

12. Pecten (Pseudamusium) Vancouverensis, Whiteaves.

Ottawa Naturalist, December, 1893, p. 133, pl. i., figs. 1, 1*a*.

This little shell was first found by Dr. Dawson in 1885, in Forward Inlet, Quatsino Sound.

It was recorded by Mr. Whiteaves as *P. Alaskensis*, Dall (see below), but he has corrected this error, and described the species as new in his paper above cited.

I obtained two specimens of *P. Vancouverensis* in Departure Bay in August, 1888, and these were compared with the Pectens in the British Museum, through the kindness of Mr. E. A. Smith, and with those in the United States National Museum by Dr. Dall and pronounced distinct. Some conchologists, however, have inclined to the view that this may be

the young of *P. caurinus*, to which, to the naked eye, it bears some resemblance.

Last summer, in company with Prof. Macoun, I dredged a series of various ages in Departure Bay, and I am satisfied that I have adult shells. The type specimen measures 7·5 × 7·75 × 2·25 mm., and is the largest I have seen.

13. PECTEN (PSEUDAMUSIUM) ALASKENSIS, Dall.

Amer. Jour. Conch., vol. vii., p. 155, pl. xvi., fig. 4 (November, 1871).

This species, with which the last named was at first confounded, did formerly inhabit our seas, as is proved by the presence of the fossil shells in a Pleistocene deposit at Point Holmes, Comox. Valves, collected and kindly given to me by Dr. Newcombe, are in my cabinet from this locality. The species is probably still living in our northern waters.

P. Alaskensis and the fry of *P. caurinus* are figured in one of the valuable and cheap United States Government publications.[1]

This inexpensive work is within the reach, and should be in the possession, of every American conchologist. The figures alluded to are on plate v., and should be compared with that of *P. Vancouverensis* in the "Ottawa Naturalist."

HINNITES, Defrance.

14. HINNITES GIGANTEUS, Gray.

Hinnita gigantea, Gray, Ann. Phil., vol. xii., p. 103 (Aug., 1826).

Not rare, being found in all the localities examined. It occurs attached to boulders from extreme low water to twenty or more fathoms in depth. Dr. Dawson found it at Queen Charlotte Islands, and in 1885 in several more southerly localities. My largest specimen is 175 × 138 mm., but I have no doubt that these dimensions are often exceeded.

LIMATULA, Searles-Wood.

15. LIMATULA SUBAURICULATA, Montagu, sp.

Pecten subauriculatus, Montagu, Test. Brit., suppl. p. 63, p. xxix., fig. 2 (1808).

This species rests its claim to a place on our list upon two living specimens dredged by Dr. Dawson in 1885, one in Forward Bay, Johnston Strait, and the other in Alert Bay, Queen Charlotte Sound. Both

[1] "Bulletin of the United States National Museum No. 37," entitled "A Preliminary Catalogue of the Shell-bearing Marine Mollusks and Brachiopods of the South-eastern Coast of United States."

specimens are in the museum of Geological and Natural History Survey at Ottawa. *L. subauriculata* is a shell of very wide range, occurring on both sides of the Atlantic from the extreme north to the Canary Islands on the east and to Florida on the west side of the ocean.

Its range in depth, according to Dr. Dall, is "6 to 843 fathoms." It has also a considerable range in *time*, being, according to Jeffreys, a fossil of the British Coralline Crag.

Being rather common in the Californian region, and also to the north of us, it is to be expected that it will be found in other localities on the Vancouver coasts.

BRYOPHILA, Carpenter.

16. Bryophila setosa, Cpr.

Ann. Mag. Nat. Hist., series 3, vol. xiii., p. 314 (April, 1864).

Described from Cape St. Lucas (Xantus) and recorded also from Californian localities.

Our first British Columbian record is that of Dr. Dawson: "Virago Sound, Queen Charlotte Islands, in 8-15 fathoms, 4 fine living specimens."

I have a single specimen which was picked up on the sands at Alert Bay by Mr. E. S. Wilkinson, and which, from a comparison with one of Mr. Xantus's original lot, I believe to belong to this species.

MYTILUS, Linne.

17. Mytilus Californianus, Conrad.

Journ. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 242, pl. xviii., fig. 15 (1837).

Common between tides and growing to a very large size. It is eaten by the Indians, and in its season is often to be seen on sale in the Victoria fish stores.

18. Mytilus edulis, Linne.

Syst. Nat., ed. xii., vol. i., pt. 2, p. 1157, no. 253 (1767). = *M. trossulus*, Gould, and many other synonyms.

Everywhere between tides. It is regularly on sale in Victoria, but is not valued as an article of food to anything like the same extent as in Europe or eastern America.

M. edulis has a very extended range, being found throughout the whole northern hemisphere.[1]

[1] Northern localities for *M. edulis*, and for the following British Columbian species, are given in a "Catalogue of shells from Bering Sea and the adjacent portions of the Arctic Ocean" which was contributed by Dr. Dall, 20 years ago, to the Proceedings of the Californian Academy of Sciences (vol. 5, p. 246-253, 1874): *Mytilus*

MODIOLA, Lamarck.

19. Modiola recta, Conrad.

Journ. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 243, pl. xix., fig. 1 (1837). Var = *Mytilus* (*Modiola*) *flabellatus* Gould, Proc. Bost. Soc. Nat. Hist. vol. iii., p. 343 (Dec., 1850); and U. S. Expl. Exped., Mollusca, p. 453, fig. 561 and 561a (1852).

A fine, large species, attaining sometimes to a length of seven inches. It has not as yet been found commonly in our waters, but perhaps it only needs searching for.

Dr. Newcombe has taken it in Ganges Harbour, Salt Spring Island, and at Clayoquot Sound. I have found it at Victoria, and have received specimens from the west coast of Vancouver Island. According to Carpenter, our local form of this species is the *M. flabellata* of Gould, which is broader than the typical *M. recta* of Conrad.

20. Modiola modiola, Linne, sp.

Mytilus modiolus, Linne, Syst. Nat., ed. xii., vol. i., pt. 2, p. 1158, no. 256 (1767).

Common everywhere. The deep water forms are much larger than the between tides varieties, attaining a length of five inches. Jeffreys (Brit. Conch., vol. ii., p. 113) records specimens, from the Northumberland coast, measuring 9¼ inches in length and proportionately broad.

ADULA, H. and A. Adams.

21. Adula stylina, Carpenter.

Rept. Brit. Assoc., 1863, p. 644 (August, 1864); and Ann. Mag. Nat. Hist., 3rd series, vol. xiv., p. 425 (Dec., 1864).

Found boring in soft rock between tides; near Victoria, Lord and Newcombe; Sooke Harbour, Professor Macoun.

MODIOLARIA, Beck.

22. Modiolaria lævigata, Gray, sp.

Modiola lævigata, Gray, Suppl. to App. to Parry's Second Voyage (1824).

Not uncommon in 10 to 30 fathoms, Victoria and Nanaimo. Dr. Dawson found a living specimen associated with *Saxicava rugosa*, at low

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edulis, *Modiola modiola*, *Modiolaria nigra*, *M. lævigata*, *M. marmorata*, *Nucula tenuis*, *Yoldia limatula*, *Leda minuta*, *Venericardia borealis*, *Lucina borealis*, *Serripes Groenlandicus*, *S. Laperousii*, *Macoma nasuta*, *M. edentula*, *M. inconspicua*, *Standella falcata*, *Mya truncata*, *Saxicava rugosa*, *Bela turricula*, *Admete Couthouyi*, *Buccinum Moerchianum*, *Chrysodomus fornicatus*, *C. liratus*, *Trophon multicostatus*, *T. orpheus*, *Purpura lima*, *Trichotropis cancellata*, *Mesalia reticulata*, *Natica clausa*, *Lunatia pallida*, *Acmæa patina*, *Cryptobranchia concentrica*, *Margarita helicina*, and *Tonicella lineata*.

Further information as to the northern range of our shells is given in later papers by the same author, reference to which will be found below under,—*Cryptodon sericatus*, *Macoma edentula*, *Penitella penita*, and *Tritonium Oregonense*.

water at Port Neville, near Johnston Strait. This would be an unusual station for the species, as it is generally found in deeper water and completely encased in a "nest" constructed chiefly of its own byssal threads.

23. Modiolaria nigra, Gray, sp.

Modiola nigra, Gray, Suppl. to App. to Parry's First Voyage, p. 244.

Distribution and station similar to those of *M. lævigata*, but the present species does not construct a "nest."

24. Modiolaria Taylori, Dall, MS.

This species has been found by me abundantly at Victoria, between tides, nestling at the roots of corallines. It is a small species not exceeding half an inch in total length and resembling in habit *M. discors*, Linne, of British seas.

This species has not been described, but has been widely distributed under Dr. Dall's manuscript name.

25. Modiolaria marmorata, Forbes, sp.

Mytilus marmoratus, Forbes, Malac. Monen., p. 44.

Recorded by Carpenter in his "Supplementary Report" as from Puget Sound (Kennerley, one specimen), with the remark, "Exactly accords with Atlantic specimens."

I was inclined to think at one time that the last named species might be the one intended, but it is so very different to *M. marmorata*, that Dr. Carpenter could not have made such a mistake. Moreover, I find that *M. marmorata* is on record from several other localities in the Pacific Ocean both to the north and the south of us. It is also found, according to Jeffreys,[1] in Japan.

CRENELLA, Brown.

26. Crenella decussata, Montagu, sp.

Mytilus decussatus, Mont., Test. Brit., suppl. p. 69 (1808).

Common in ten to twenty-five fathoms and probably to greater depths. Our shells are much larger than Atlantic specimens. Mr.

[1] "On some Species of Japanese Marine Shells and Fishes which inhabit also the North Atlantic," by J. Gwyn Jeffreys in Journal of the Linnean Society (Zoology), vol. xii., p. 100, November, 1874. In this paper Dr. Jeffreys mentions more than forty species of mollusca common to Japanese and European waters, and, as might be expected, the majority of these species occur also on the West American coast. Several additions to the list have been made by subsequent writers.

Whiteaves gives the dimensions of a specimen dredged by Dr. Dawson in Alert Bay at 12 × 11 × 7·5 mm., and I have a shell slightly larger even than this.[1]

According to Dr. Dall's arrangement, which we are following, the suborder *Naiadacea* will come in here. We have two species of this order, of course inhabiting fresh water, and belonging to the family *Unionidæ*. They are :

27. ANODONTA NUTTALLIANA, Lea.

28. MARGARITANA MARGARITIFERA, Linne, sp.

AXINÆA, Poli.

29. AXINÆA SEPTENTRIONALIS, Middendorff, sp.

Pectunculus septentrionalis, Midd., Mal. Ross., pt. iii., p. 67, pl. xxi., fig. 1-3 (1849), var. = *A. subobsoleta*, Cpr., Rept. Brit. Assoc., 1863, p. 644 (Aug., 1864); and Ann. Mag. Nat. Hist., 3rd series, vol. xiv., p. 425 (Dec., 1864).

This species does not occur in the neighbourhood of Victoria, so far as I have observed. It is found, however, not uncommonly on the western and northern coasts of Vancouver Island and at the Queen Charlotte Islands. (Dawson.)

Our shell is the *A. subobsoleta* of Carpenter, but its specific identity with the *septentrionalis* of Middendorff is doubted by some conchologists.

NUCULA, Lamarck.

30. NUCULA CASTRENSIS, Hinds.

Proc. Zool. Soc. London, 1843, p. 98; and Zool. Voy. Sulph., vol. ii., p. 63, pl. xviii., fig. 5 (1844), = *N. Lyalli*, Baird, Proc. Zool. Soc. London, 1863, p. 71.

This shell, which is undoubtedly the *N. Lyalli* of Baird, and almost certainly the *N. castrensis* of Hinds, is the commonest bivalve shell occurring in our seas. In Departure Bay last year I dredged more than 2,000 specimens of it in one day. Dr. Dawson dredged it at the Queen Charlotte Islands and in many localities to the north of Vancouver Island.

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[1] Since writing the above I have had occasion to examine the description and figures of the true *C. decussata* of the Atlantic, and I find that our British Columbian shells do not belong to that species at all. Mr. Whiteaves, in his account of Dr. Dawson's collections, has twice recorded our shells as *C. decussata*, and as the species had already been found on the Californian coast, I suppose we accepted his determination of the shell without question. Our species may be *C. faba*, O. Fab., but unfortunately I cannot at this moment refer to either descriptions or specimens of this species.

31. Nucula tenuis, Montagu, sp.

Arca tenuis, Mont., Test. Brit., Suppl. p. 56, pl. xxix., fig. 1 (1808).

Occurs with the last named species, but is not quite so common.

LEDA, Schumacher.

32. Leda fossa, Baird.

Proc. Zool. Soc. London, 1863, p. 71.

This species was described from a single specimen taken by Dr. Lyall in Esquimalt Harbour. It was also represented by a single specimen in Dr. Kennerley's collection.

Though *L. fossa* is very abundant in the "Leda clay" of Victoria, I have never succeeded in finding recent specimens. Mr. Whiteaves records with a query "a single worn valve," Duncan Bay, V. I. (Dr. Dawson.)

33. Leda minuta, Müller, sp.

Arca minuta, Müll., Prodr. Zool. Dan., p. 247, no. 2985 (1776).

This is the common *Leda* at Victoria and northward to the Queen Charlotte Islands. It is much smaller than *L. fossa*, and its sculpture is quite different. I have not yet found this species in the Leda clay.

34. Leda acuta, Conrad.

= ? *L. cælata*, Hinds.
= ? *L. cuneata*, Sby.

There is certainly a third species of *Leda* in our seas, but I am not sure what it should be named. Mr. Whiteaves, in his paper on the Queen Charlotte Islands Mollusca, records a single valve from Houston-Stewart Channel as *L. cælata*, Hinds.

In his next paper (Trans. Roy. Soc. Can., 1886) he refers ten shells of the same species from Quatsino Sound to *L. acuta*, but suggests, quoting Drs. Dall and Cooper, that *acuta*, Conrad, *cælata*, Hinds, and *cuneata*, Sby., are one and the same species. I have not access to the literature or specimens necessary to a decision on such a point, and therefore follow Whiteaves in adopting the name *L. acuta*, but I may say that the shells from Quatsino Sound above mentioned are not conspecific, in my opinion, with some received as *L. acuta* from California (Hemphill).

YOLDIA, Möller.

35. Yoldia thraciæformis, Storer, sp.

Nucula thraciæformis, Storer, Bost. Jour. Nat. Hist., vol. ii., no. 1, p. 122, figure (1838).

Two small living specimens, Forward Inlet, Quatsino Sound, Dr. Dawson.

I do not know of any other record of the occurrence of this eastern American species on the Pacific coast.

36. YOLDIA LANCEOLATA, J. Sowerby, sp.

Nucula lanceolata, J. Sby., Mineral Conchology.

Fairly common at Victoria, Nanaimo, etc., and occurring also at the Queen Charlotte Islands and in Quatsino Sound (Dawson).

The "very large" specimens recorded from Comox by Dr. Newcombe should probably be referred to the next species.

37. YOLDIA SEMINUDA, Dall.

Amer. Journ. Conch.,[1] vol. vii., p. 153 (Nov., 1871).

This species might be mistaken at first sight for *Y. lanceolata*, but when carefully examined it is seen to be quite distinct. It is a larger species than *lanceolata*, and the diagonal sculpture does not extend beyond the middle line of the shell, while in the last named species it reaches to the anterior margin.

Y. seminuda was described from St. Paul's Harbour, Radiak, 17 fms. My specimens were dredged outside Victoria Harbour, and the species has not so far been recognized elsewhere in the province.

38. YOLDIA LIMATULA, Say, sp.

Nucula limatula, Say, American Conchology, pt. ii., pl. xii. (April, 1831).

I dredged this species in Departure Bay in 1888, and near Victoria in 1891. It is like the two last named species in colour, but lacks the diagonal grooves they both possess.

This shell was identified for me by Dr. Dall.

39. YOLDIA, species.

Three fine specimens of a *Yoldia* that I have not yet identified were obtained last year in Sooke Harbour by Professor Macoun. The species resembles *Y. limatula* in colour, but differs in its very peculiar shape.

40. YOLDIA AMYGDALEA. Valenciennes.

Zool. Voy. Venus, Mollusca, pl. xxiii., fig. 6 (1846).

This species has been dredged at Victoria, Departure Bay and Comox, but appears to be rather rare. Its dark colour and the absence of the diagonal sculpture distinguish it from the preceding species.

[1] The paper in which *Y. seminuda* and some seven or eight others of our British Columbian species are described is entitled "Descriptions of 60 new forms of Mollusks from the west coast of North America and the North Pacific Ocean, with notes on others already described." It was published in the American Journal of Conchology for 1871, vol. vii., pp. 93 to 160, plates 13 to 16.

Mr. E. A. Smith (in Ann. Mag. Nat. Hist., series 5, vol. vi., p. 289 [1880]) described *Yoldia Vancouverensis*, n. sp., from a specimen taken near Victoria. Judging by the description, *Vancouverensis* must be placed in the synonymy of *Y. amygdalea*.

VENERICARDIA, Lamarck.

41. Venericardia ventricosa, Gould, sp.

Cardita ventricosa, Gould, Proc. Bost. Soc. Nat. Hist., vol. iii., p. 276 (July, 1850); and U. S. Expl. Exped., Mollusca, p. 417, figs. 532, 532*a* (1852).

Very common, occurring with *Nucula castrensis* in all localities yet examined. Our shells are certainly the *V. ventricosa* of Gould, but this species was considered by Carpenter to be a variety only of *V. borealis*, Conrad (Amer. Mar. Conch.), and this last is consequently the name usually given in our lists. Lately, however, Dr. Stearns[1] has figured and compared the two forms, and has pronounced them to be distinct.

Mr. Whiteaves (in Rept. Prog. Geo. Surv. Canada, 1878-79) speaks of *both* forms as occurring in Dr. Dawson's Queen Charlotte Islands collection. All the local specimens I have seen are unmistakably *ventricosa*.

CARDITAMERA, Conrad.

42. Carditamera subquadrata, Carpenter, sp.

Lazaria subquadrata, Cpr., Rept. Brit. Assoc., 1863, p. 642 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 178 (March, 1865).

This shell was first recorded from these waters by Carpenter on the strength of a single valve in Swan's collection; exact locality not stated. Single valves are not uncommon among shells brought by the Indians from the western and northern coasts, and I have myself found valves on the beaches near Victoria. So far, however, the species has not been found here alive.

MIODON, Carpenter.

43. Miodon prolongatus, Carpenter.

Rept. Brit. Assoc., 1863, p. 642 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xiv., p. 424 (December, 1864).

This is not a common shell with us. A few specimens have been found at Victoria, Departure Bay, and at Salt Spring Island, in some instances in sand between tide marks, and in others in deeper water.

Further to the north it appears to be more plentiful, for Mr.

[1] "Scientific Results of Explorations by the United States Fish Commission steamer Albatross. XVII. Descriptions of new West American Land, Fresh-water and Marine Shells, etc." Proc. U. S. Nat. Museum, vol. xiii., no. 813 (1890).

Whiteaves records it from "Dolomite Narrows, abundant; mouth of Cumshewa Harbour, in twenty fathoms, several; Houston-Stewart Channel, in fifteen to twenty fathoms, three or four specimens."

ASTARTE, J. Sowerby.

44. ASTARTE UNDATA, Gould.

Invertebrata of Massachusetts, p. 80 (1841); ed. ii., p. 121.

This species was recorded by Mr. Whiteaves from Metlakatla in 1878 as *Astarte semisulcata*, Leach?

In 1886, after an examination of the specimens collected by Dr. Dawson to the north of Vancouver Island, he withdrew this name and substituted, and we think rightly, *A. undata*, Gould, which name we have adopted for our largest *Astarte*. This is not by any means so abundant a shell here as is the next species, but it is fairly common at Victoria and in other localities in which dredging has been done on the eastern and northern coasts of Vancouver Island.

45. ASTARTE ESQUIMALTI, Baird, sp.

Crassatella Esquimalti, Baird, Proc. Zool. Soc., London, 1863, p. 70, pl. ii., fig. 15. = *Rictocyma mirabilis*, Dall, Amer. Jour. Conch., vol. vii., p. 151, pl. xiv., fig. 6 (Nov., 1871).

This is our commonest *Astarte*, and may be easily distinguished by its smaller size and wavy sculpture from the last named species. It is rather rare at Victoria but is abundant at Nanaimo and Comox, and was found by Dr. Dawson at several points at the north of Vancouver Island, and also at the mouth of Cumshewa Harbour, Queen Charlotte Islands.

46. ASTARTE COMPACTA, Carpenter.

Rept. Brit. Assoc., 1863, p. 642 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 57.

A single living specimen was collected by Dr. Kennerley in Puget Sound. Dr. Carpenter described it as "*Astarte* (? var.) *compacta*," and suggested that it might prove to be identical with *A. compressa*, Montagu, a European species.

I do not think that any further specimens of this species? have been found.

KELLIA, Turton.

47. KELLIA LAPEROUSII, Deshayes, sp.

Chironia Laperousii, Desh., Rev. Zool. Soc. Cuv., p. 357 (Dec., 1839); and Mag. de Zool. (Guerin's), pl. xii. (1841); var. *Chironii*, Cpr., Rept. Brit. Assoc., 1863, p. 643 (Aug., 1864); and Jour. de Conch., vol. xii., p. 136 (April, 1865).

This is a very common species usually occurring in the interior of dead bivalve shells. It has been found in all localities in British

Columbia in which search has been made. At Vesuvius Bay, I obtained very fine specimens from the burrows of *Penitella penita*. In many cases the dead *Penitella* inclosed *Saxicava rugosa*, also dead, and containing in its turn numerous specimens of *Kellia*.

The variety *Chironii* is characterized by Carpenter as "thinner, less transverse, margins rounded," but the shells of this species are so very variable in shape that it seems hardly necessary to apply a separate name to a particular form.

Fine specimens of *K. Laperousii* frequently exceed 25 mm. in length.

48. KELLIA SUBORBICULARIS, Montagu, sp.

Mya suborbicularis, Mont., Test. Brit., p. 564, and suppl. p. 39, pl. xxvi., fig. 6 (1803 and 1808).

This does not appear to be so common a shell as the last named, but I think that in many cases it may have been passed over as the young of *Laperousii*.

I have found the two species together at Victoria and Salt Spring Island, and Dr. Dawson dredged it in several localities near the Queen Charlotte Islands.

PYTHINA, Hinds.

49. PYTHINA RUGIFERA, Carpenter.

Rept. Brit. Assoc., 1863, p. 643 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 57.

This species was described from two living specimens obtained by Dr. Kennerley in Puget Sound. No other specimens have been found so far as I am aware.

LEPTON, Turton.

50. LEPTON RUDE, Whiteaves.

Rept. Prog. Geol. Surv. Canada, 1878-79, p. 198B, fig. 2.

This curious shell is not uncommon on muddy shores, where it is to be found attached to the ventral segments of a crustacean, *Gebia Puget-tensis*.

The prawn in question is a common species, but in most localities only a small percentage will be found with the attached *Lepton*.

LASÆA, Leach.

51. LASÆA RUBRA, Montagu, sp.

Cardium rubrum, Mont., Test. Brit., Suppl. p. 83, pl. xxvii., fig. 4 (1808).

Common near Victoria, generally at the roots of seaweed in tide pools. Dr. Kennerley obtained a single specimen of this species in Puget

Sound, but no recent collectors, with the exception of myself, seem to have observed it.

As Carpenter remarks, our shells "exactly accord with British specimens."

TELLIMYA, Brown.

52. TELLIMYA TUMIDA, Carpenter.

Rept. Brit. Assoc., 1863, p. 643 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 58.

Common in sand between tide marks all round the coast of Vancouver Island and northward to Queen Charlotte Islands.

The specimen recorded by Whiteaves from Virago Sound as *Turtonia minuta*, O. Fab., belongs to the present species. I believe that a species of *Turtonia* is found in the Alaska province, but our shell does not belong to that genus.

CRYPTODON, Turton.

53. CRYPTODON SERICATUS, Carpenter.

Rept. Brit. Assoc., 1863, p. 643 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 57.

Extremely common in sand below low water mark wherever we have dredged—Esquimalt, Victoria, Sooke, Departure Bay, Comox, west coast of Vancouver Island, and the Queen Charlotte Islands.

54. CRYPTODON FLEXUOSUS, Montagu, sp.

Tellina flexuosa, Mont., Test. Brit., suppl. p. 72 (1808).

A very rare species in this province, though common in the British seas.

It was first found on the west American coast by Dr. J. G. Cooper who dredged it in 120 fathoms near the Catalina Islands.

Dr. Dawson dredged three perfect specimens in 111 fathoms at Dixon entrance, Queen Charlotte Islands, and obtained it also in shallow water at False Bay, Straits of Georgia (four specimens), and Quatsino Sound (two specimens). I have myself dredged dead valves in Departure Bay.

Jeffreys gives its range in the British seas as three to eighty-seven fathoms.

LUCINA, Bruguière.

55. LUCINA TENUISCULPTA, Carpenter.

Rept. Brit. Assoc., 1863, p. 642 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 57.

A very common species, having the same station as *Cryptodon sericatus*, and occurring in the same localities. It varies a good deal in

shape, being at times very tumid and at other times much flattened. Fine specimens from Sooke measure $9\frac{1}{2} \times 11 \times 4$ mm.; others, from Departure Bay, of a quite different shape, $9 \times 9 \times 6\frac{1}{2}$ mm.

56. Lucina acutilineata, Conrad.

Small living specimens and larger dead ones have been dredged in several localities from Victoria to Queen Charlotte Islands. Dr. Newcombe found the dead valves abundant on the shore at low water at Clayoquot Sound.

In Whiteaves's papers this species appears as *Lucina filosa*, Simpson, but Stearns has recently shown that the east coast species is different, and that our shell should be styled *Lucina acutilineata*, Conrad. Dr. Carpenter supposed this last to be a form of the European *L. borealis*, Linne, and Jeffreys could see no good reason for separating *borealis* and *filosa*.

The three forms are nearly allied and, I should say, are at best geographical varieties of one species. If they are to be united then *borealis* is of course the oldest name.

DIPLODONTA, Brown.

57. Diplodonta orbella, Gould, sp.

Lucina orbella, Gould, Proc. Bost. Soc. Nat. Hist., vol. iv., p. 90 (November, 1851).

Not common. I have only found dead shells which I dredged in Departure Bay, but Dr. Dawson obtained living specimens at the Queen Charlotte Islands by dredging, and at low water at Malaspina Inlet, and again between Nahwitti Bar and Quatsino Sound, Vancouver Island.

Dr. Newcombe has reported it as being found in *mud* at Comox and Salt Spring Island. In California it is not uncommon and is found, according to Mr. Orcutt,[1] "in holes in rocks or in dead bivalves."

CARDIUM. Linne.

58. Cardium Nuttalli, Conrad.

Jour. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 229, pl. xvii., fig. 3 (1837).

This species is now generally considered to be distinct from the *Pectunculus corbis* of Martyn with which Carpenter united it. It is a

[1] "Notes on the Mollusks of the vicinity of San Diego, Cal., and Todos Santos Bay, Lower California," Proc. U. S. Nat. Mus., vol. viii., 1885. This paper and the following: "Annotated list of shells of San Pedro Bay and vicinity," by Mrs. Burton Williamson, Proc. U. S. Nat. Mus., vol. xv., 1892, as well as the earlier "Geographical Catalogue of Mollusca" (1867), of Dr. J. G. Cooper, and the Monterey list of the same author (Amer. Jour. Conch., vol. vi., 1870), should be consulted for information as to the southern range of our species.

fine species and occurs commonly in sand between tides on all our coasts. It is largely consumed by Indians and others in the proper season.

59. Cardium Californiense, Deshayes.

Rev. Zool. Soc. Cuv., p. 360 (Dec., 1839); and Mag. de Zool. (Guerin's), pl. xlvii. (1841): var. = *C. blandum*, Gould, Proc. Bost. Soc. Nat. Hist., vol. iii., p. 276 (July, 1850); and U. S. Expl. Exped., Mollusca, p. 418, fig. 534, 534a (1852).

This cockle is never found living above low water mark, but has been dredged, though not very abundantly, wherever dredging has been carried on.

At Victoria, where we have had the opportunity to examine a number of specimens; there appear to be two varieties differing in shape and number of ribs. Gould in his description of *Cardium blandum*, which clearly refers to our shell, speaks of this variation in form. The ribs are often nearly 50 in number, and the interior of the shell is frequently more or less tinted with rose colour.

There is a third species of *Cardium* (the name of which I have not been able to ascertain) abundant in the Leda clay at Victoria.

SERRIPES, Beck.

60. Serripes groenlandicus, Auct.

Cardium Groenlandicum, etc., Chemnitz, Conch. Cab., vol. vi., p. 202, pl. xix., fig. 198. = *edentulum*, Montagu, 1808 (according to Carpenter).

Chemnitz was not binomial in volume vi., and his name is not therefore entitled in strictness to priority. It would serve no good purpose however to change a name that has come into universal use.

I have dredged dead specimens of this shell at Victoria and Departure Bay, and Dr. Newcombe has obtained it in these places and alive in Deep Bay, near Comox. He also reports it as fossil in the boulder clay in various localities.

61. Serripes laperousii, Deshayes, sp.

Cardium Laperousii, Desh., Rev. Zool. Soc. Cuv., p. 360 (Dec., 1839); and Mag. de Zool. (Guerin's), pl. xlviii. (1841).

According to Mr. Whiteaves a single living specimen of this species was dredged by Mr. Richardson, near Victoria, in 1875, but no other specimens have been obtained here so far as I know.

62. Serripes centifilosum, Carpenter, sp.

Cardium centifilosum, Cpr., Rept. Brit. Assoc., 1863, p. 642 (August, 1864); and Proc. Cal. Acad. Nat. Sci., vol. iii. (1866).
C. Adamsi, Tryon, 1871.
= *C. modestum*, Ad. and Rve., 1850, not Philippi, 1848.
C. Richardsoni, Whiteaves, 1878.

Tryon, in his catalogue of *Cardiidæ*, 1871, ignores Carpenter's name and re-names the species *Adamsi*, on the ground that *modestum* is pre-occupied by Philippi.

Mr. Whiteaves, in the "Ottawa Naturalist" for December, 1893, p. 134, acknowledges his *C. Richardsoni* to be a synomyn of *C. modestum*, Ad. and Rve., but says that he described it "as a new species almost entirely on the authority of Dr. Carpenter," who would thus seem to have failed to recognize his own *C. centifilosum*. There is little doubt, however, that all the above mentioned names refer to one and the same species.

S. centifilosum is not a common shell with us. Mr. Richardson dredged a single living specimen (the type of *C. Richardsoni*) in 30-50 fathoms, between Race Island lighthouse and Victoria Harbour. I have dredged a few living and several dead shells in the same locality and in Departure Bay. Other recent collectors do not seem to have met with it.

VENUS. Linne.

63. Venus Kennerleyi, Reeve.

Conch. Icon., Mon. of Venus, no. 41, 1863.

This fine species is not very common. Richardson dredged it alive at Victoria; Dawson took it in some numbers at the Queen Charlotte Islands and subsequently in Duncan and Freshwater Bays. I have myself dredged it alive in Departure Bay, and Dr. Newcombe has found it both living and dead at Victoria. It is a dull, heavy shell with strong concentric ribs and distinctly crenulated edges to the valves

PSEPHIS, Carpenter.

64. Psephis tantilla, Gould, sp.

Venus tantillus, Gould, Bost. Jour. Nat. Hist., vol. vi., no. 3, p. 406, pl. xv., fig. 10 (October, 1853).

Plentiful in sand between tide marks near Victoria, and also common, according to Dr. Newcombe, at Comox and Clayoquot. Professor Macoun also collected it at Sooke. Dr. Dawson did not find it at the Queen Charlotte Islands or elsewhere, but as he did very little shore collecting he might easily pass over so small a shell.

Gould's type was from Santa Barbara, and Dr. Cooper dredged the species in that neighbourhood in 12 to 20 fathoms. As stated above our specimens have all been taken between tides.

65. PSEPHIS LORDI, Baird, sp.

Chione Lordi, Baird, Proc. Zool. Soc. London, 1863, p. 69, pl. ii., fig. 10.

This shell is quite as common as the last named, but as it inhabits deep water it can only be obtained by dredging. It has been found in nearly all the localities in which collections have been made. Dr. Newcombe speaks of finding it at extreme low water; Dr. Dawson, on the other hand, dredged it at a depth of 111 fathoms. Its usual station seems to be in clean sand in 10 to 30 fathoms in company with *Mesalia reticulata*, *Cryptodon sericatus*, etc. The absence of the purple stain readily distinguishes this species from *P. tantilla*, which is moreover a much smaller shell.

CLEMENTIA, Gray.

66. CLEMENTIA SUBDIAPHANA, Carpenter.

Rept. Brit. Assoc., 1863, p. 640 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 56.

Generally distributed, but not common. It has been dredged by Dr. Dawson in Quatsino Sound and at the Queen Charlotte Islands; by Dr. Newcombe at Comox, Clayoquot, etc.; by myself at Departure Bay and Victoria. The young shells are generally coated with sand, like *Lyonsia* and some other species.

TAPES, Muhlfeldt.

67. TAPES STAMINEA, Conrad, sp.

Venus staminea, Conr., Journ. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 250, pl. xix., fig. 14 (1837).
= *Venerupis Petitii*, Deshayes, 1839.
= *Venus rigida*, Gould (pars), 1850.
vars. = *diversa*, Sby.; *ruderata*, Desh.; *tumida*, Sby.; *orbella*, Cpr., etc.

Very common between tides, generally among stones on muddy shores. This species varies much in shape and sculpture. Sometimes it is found in the burrows of *Penitella penita* and is distorted after the manner of *Petricola*. The colour is also variable, the common variety being white, but some specimens are almost as brightly coloured as the Californian *Tapes grata*. An extreme variety is dark chocolate colour.

Tapes staminea is a common article of food.

68. Tapes tenerrima, Gould and Carpenter.

Proc. Zool. Soc. London, 1856, p. 200; = *Venus rigida*, Gould (pars), 1850.

This fine species is not nearly so common as the last named. I have only found it in one locality, namely, Cadboro' Bay, near Victoria, where it occurs in sand between tide marks. Dr. Newcombe has found it in a similar situation at Clayoquot Sound.

In a systematic arrangement our nine species of fresh-water *Corbiculidæ* must be placed here.

They are:

69. Sphærium rhomboideum, Say, sp.
70. " tumidum, Baird.
71. " Spokani, Baird.
72. " Raymondi, J. G. Cooper.
73. Pisidium variabile, Prime.
74. " abditum, Haldeman.
75. " ultramontanum, Prime.
76. " sp.
77. " sp.

All of the above have been taken by myself on Vancouver Island, except *S. tumidum* and *S. Spokani*, which were described by Baird from localities on the mainland of British Columbia.

SAXIDOMUS, Conrad.

78. Saxidomus squalidus, Deshayes.

Brit. Mus. Cat. of Veneridæ, p. 188, no. 5 (1853).

Very common everywhere between tides, and largely used by Indians and others as an article of food.

PETRICOLA, Lamarck.

79. Petricola carditoides, Conrad, sp.

Saxicava carditoides, Conrad, Jour. Acad. Nat. Sci. Phila., vol. vii., pt 2, p. 255, pl. xx., fig. 8 (1837) + *Sax. Californica*, Conr., *op. cit.*, p. 256, pl. xx., fig. 9.

This is the name by which this shell has long been known, though there appear to be several older ones, *e. g.*, *nivea*, Chem., *rugosa*, Sby., and *tenuis*, Sby.

Carpenter records it from Puget Sound (Kennerley) and Vancouver Island (Swan). Richardson is said to have found four living specimens at Victoria in 1875, and Dr. Newcombe obtained young specimens at

Clayoquot last autumn. I do not know of any other record of its occurrence in this province, and I have never taken it myself.

PSAMMOBIA, Lamarck.

80. Psammobia rubroradiata, Nuttall.

This species seems to be rare, or at any rate difficult to find. It was represented in the collections of Kennerley and Swan by dead shells, and single valves have been found in many localities on all our coasts from Victoria to the Queen Charlotte Islands. I have not seen living specimens, but I believe that Dr. Newcombe found a few at Comox and at Clayoquot.

MOERA, H. and A. Adams.

81. Moera salmonea, Carpenter.

Rept. Brit. Assoc., 1863, p. 639 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xiv., p. 423 (1864).

Found by Dr. Dawson in several northern localities,—Quatsino Sound, Queen Charlotte Sound and Queen Charlotte Islands. Also by Dr. Newcombe at Clayoquot Sound. A few specimens were kindly given to me some years ago by Capt. Clarke, who had dredged them near Comox. I have not seen any specimens from Victoria or Nanaimo.

ANGULUS, Muhlfeldt.

82. Angulus modestus, Carpenter.

Rept. Brit. Assoc., 1863, p. 639 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 56; var. = *A. obtusus*, Carpenter.

This little shell is common in sand between tides, and is sometimes found in deeper water. Dr. Dawson took it at the north of Vancouver Island, but not near the Queen Charlotte Islands, Dr. Newcombe found it at Clayoquot, and it is abundant at Victoria, Departure Bay and Comox.

83. Angulus variegatus, Carpenter.

Rept. Brit. Assoc., 1863, p. 639 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xiv., p. 424 (1864).

This species was one of Swan's additions to the Vancouver list, and it was stated by him to be "rare." Only a single specimen has been found here since Swan's time, and that has been recorded by Mr. Whiteaves as "a fully grown living specimen," taken by Dr. Dawson at Quatsino Sound in thirty to fifty fathoms. (Trans. Roy. Soc. Canada, 1886.) The record of *A. variegatus* in Mr. Whiteaves's earlier paper (in

Rept. Prog. Geo. Surv. Can., 1878-79) is said by him to be a misprint, and to refer to *Moera salmonea*. *A. variegatus* is not rare on the Californian coasts.

84. Angulus Gouldii, Carpenter.

A. Gouldii (Hanley, MS.), Cpr., Rept. Brit. Assoc., 1863, p. 639 (August, 1864); and Jour. de Conch., vol. xii., p. 132 (April, 1865).

This shell is recorded by Dr. Newcombe in his paper in the "Bulletin of the Natural History Society of British Columbia" as having been found by himself at Comox. He adds to his note: "Mr. Dall states that these may be the young of *T. inflatula*."

PERONÆA, Poli.

85. Peronæa Bodegensis, Hinds, sp.

Tellina Bodegensis, Hinds, Zool. Voy. Sulph., vol. ii., p. 67, pl. xxi., fig. 2 (1844).

This species appears to be confined, in this province, to the western and northern coasts of Vancouver Island.

Dr. Dawson took six living specimens between Nahwitti Bar and Quatsino Sound, and Dr. Newcombe found specimens, also living, at low water at Clayoquot Sound.

I have seen a few specimens from other west coast localities, but have never taken this species on the eastern side of the island.

MACOMA, Leach.

86. Macoma secta, Conrad, sp.

Tellina secta, Conr., Jour. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 257 (1837).
= *ligamentina*, Deshayes, 1843. (A most appropriate name.)

Of our many native Macomas this is the first and finest. It is found in sand near low water in nearly all the localities examined; specimens from the west coast appearing to be rather larger and heavier than those from the neighbourhood of Victoria.

Dr. Newcombe, in his paper so often quoted, credits Dr. Dawson with having taken this species at the Queen Charlotte Islands, but I cannot find the record in Mr. Whiteaves's report of Dr. Dawson's collections. As before mentioned, Dr. Dawson does not appear to have made any special search for shore shells, and may therefore easily have overlooked this species, which, however, doubtless occurs in the localities he visited.

Carpenter speaks of a variety *edulis*, Nuttall, as being the northern form of *secta*, and as occurring in Puget Sound.

87. Macoma nasuta, Conrad, sp.

Tellina nasuta, Conrad, Jour. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 258 (1837).

This and the next named species are very abundant between tides on all our coasts, and in their season are often exposed for sale in the Victoria markets.

88. Macoma inquinata, Deshayes.

Proc. Zool. Soc. London, 1854, p. 357.

Very common ; see note under last species.

89. Macoma edentula, Broderip and Sowerby, sp.

Tellina edentula, Br. and Sby., Zool. Jour., vol. iv., pt. 15, p. 363 (1829).

This is the name I apply to a *Macoma* that I have not infrequently dredged at Nanaimo (but always dead), and which I have also found living in sand between tides at Cordova Bay.

It bears some resemblance to a very large variety of *M. inconspicua*, and possibly the large specimens from False Head, Vancouver Island, recorded by Mr. Whiteaves as *M. inconspicua*, may prove to be the present species.

Dall's figure of his *Macoma Middendorffi* (= *edentula*, Middendorff, not Brod. and Sby.) Proc. U. S. Nat. Museum, 1886, pl. iv., fig. 11,[1] is wonderfully like some specimens of our shell.

90. Macoma lata, Gmelin, sp.

Tellina lata, Gmel., Syst. Nat., ed. xiii., vol. i., pt. 6, p. 3237. (1788).
= *T. calcarea*, Chemnitz. 1782. (Not binomial).
= *T sabulosa*, Spengler. 1798.
= *T. proxima*, Brown. Etc., etc.

This form is quite different to the one last named. I have found it (dead) wherever I have dredged, and it is a not uncommon fossil in the Leda clay. Dr. Dawson obtained living specimens by dredging at Dixon Entrance in 111 fathoms, and in Quatsino Sound in shallower water.

Mr. Whiteaves adopts the specific name *sabulosa* in his first report and *calcarea* in his second. As before mentioned (under *Serripes Grœnlandicus*), Chemnitz in volume vi. of the Conchylien Cabinet is not binomial, and therefore his name should not be used, and Spengler's name is ante-dated by the appropriate one of Gmelin.

[1] In this paper, which is entitled "Supplementary notes on some species of Mollusks of the Behring Sea and vicinity," Dr. Dall has interesting notes on several of our species besides the *Macoma edentula*, namely :—*Mangilia levidensis*, *Bela sculpturata*, *Admete Conthonyi*, *Trophon muriciformis* (= *Dallii*), *T. orpheus*, *T. tenuisculptus* and *Alvania castanea*. Also excellent figures of *M. Middendorffi* (see above), *B. sculpturata*, *T. Dalli* and *A. castanea*. Dr. Dall has previously called attention to *M. edentula* in a paper in the same Proceedings, vol. vii., 1884, p. 347.

91. Macoma expansa, Carpenter.

Macoma (? v.) *expansa*, Cpr., Rept. Brit. Assoc., 1863, p. 639, (Aug., 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 56.

This is the name applied by Dr. Carpenter to some shells obtained by Dr. Kennerley in Puget Sound. Dr. Carpenter himself noted the close resemblance to *lata* = *calcarea*, and I suspect that *M. expansa* will prove to be only a variety of that species.

92. Macoma inconspicua, Broderip and Sowerby, sp.

Tellina inconspicua, Br. and Sby., Zool. Jour., vol. iv., pt. 15, p. 363 (1829); and Zool. Voy. Blossom, p. 153, pl. xli., fig. 6 (1839).

Very common and variable. Found everywhere in sand between tides.

Jeffreys and others have united this species with *Macoma lata*. By a similar process of lumping together allied forms, the number of species of *Macoma* may be considerably reduced, but there seems little doubt, to my mind, as to the specific distinctness of all the forms above enumerated. On this coast, at any rate, they do not seem to intergrade at all.

93. Macoma Carlottensis, Whiteaves.

Rept. Prog. Geo. Surv. Canada, 1878-79, p. 196B, fig. 1 (1879).

This species is only known to us from the original description and specimens. The latter were obtained by Dr. Dawson in 1878 in "Virago Sound in from eight to fifteen fathoms, abundant."

94. Macoma yoldiformis, Carpenter.

Rept. Brit. Assoc., 1863, p. 639 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 55.

Described from specimens from Puget Sound (Kennerley) and Vancouver Island (Swan). It has since been obtained by Dr. Newcombe and myself by dredging in various localities on both the east and west coasts of the island, and it is probably widely distributed.

The "*Macoma*, n. sp.," mentioned by Dr. Newcombe, in his list, as taken at Clayoquot Sound, seems to me to be identical with this species.

95. Macoma inflatula, Dall.

(See note under *Angulus Gouldii*.)

Œdalina subdiaphana, Cpr., is in Dr. Newcombe's catalogue, with the note, "One living specimen at low water Clayoquot Sound." The

specimen, which I have seen, is not an *Œdalina*, but may belong to the last named species of *Macoma*.

CUMINGIA, Sowerby.

96. Cumingia Californica, Conrad.

Journ. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 234, pl. xvii., fig. 12 (1837).

This species is included in our list on the strength of Mr. Whiteaves's record (in the Ottawa Naturalist for December, 1893) of a single specimen collected by Professor Macoun in 1887 at Barclay Sound.

SEMELE, Schumacher.

97. Semele rubropicta, Dall.

Amer. Jour. Conch., vol. vii., p. 144, pl. xiv., fig. 10 (November, 1871).

This is the shell that Californian conchologists, following Carpenter, called *S. rubrolineata*, Conrad, but Dr. Dall, believing, as Dr. Carpenter himself suspected, that it is not the species intended by Conrad, has redescribed it, with an excellent figure, in the American Journal of Conchology, *loc. cit.*

The shell is by no means common, but has been found, dead, at Victoria and Departure Bay, and, by Dr. Newcombe, at Clayoquot.

SILIQUA, Muhlfeldt.

98. Siliqua patula, Dixon, sp.

Solen patulus, Dixon, Voyage, etc., p. 355, fig. 2 (1789).

This fine species is more common on the west and north than on the east coast of Vancouver Island, though both Dr. Newcombe and myself have dredged young specimens near Victoria.

Dr. Dawson found this shell dead on the beach at Masset and Rose Point, Queen Charlotte Islands, and Dr. Newcombe procured fine living specimens in the sands, between tides, at Clayoquot. I have received these shells also from other points on the west Vancouver coast.

I have not heard of this species being sold or used for food in this province, but the first discoverers of the shells, Captain Dixon's crew, are said to have preferred them to the cockles, *C. Nuttalli*, that abounded in the same locality.

SOLEN, Linne.

99. Solen sicarius, Gould.

Proc. Bost. Soc. Nat. Hist., vol. iii., p. 214 (May, 1850); and U. S. Expl. Exped., Mollusca, p. 387, fig. 501-501b (1852).

Generally distributed, but not easy to obtain, as it lives buried rather deeply in sand below low water-mark, and is consequently seldom

dredged except when very young or when dead. The dead shells in greater or less number have been found at Victoria, Departure Bay, Comox and Clayoquot.

SPISULA, Gray.

100. Spisula falcata, Gould, sp.

Mactra falcata, Gould, Proc. Bost. Soc. Nat. Hist., vol. iii., p. 216 (May, 1850); and U. S. Expl. Exped., Mollusca, p. 393, fig. 506-506b (1852).

This species has been found dead by Dr. Dawson at the Queen Charlotte Islands, and by Dr. Newcombe at Comox and Victoria.

In Carpenter's "Supplementary Report" it is given as from Puget Sound (Kennerley) and Vancouver Island (Swan). I have not myself as yet succeeded in finding specimens.

101. Spisula planulata, Conrad, sp.

Mactra planulata, Conr., Journ. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 240 (1837).

Of this species I have dredged numerous young specimens in Departure Bay. Dr. Newcombe has found it at Clayoquot, and Mr. Harvey at Comox.

Dr. Dall, finding the nomenclature of the Pacific coast *Mactridæ* in a very unsatisfactory condition, has been lately working up the subject. A first paper by him, entitled, "On the Species of *Mactra* from California," has appeared in the "Nautilus" for April of the present year and should be consulted for notes on our species.[1]

DARINA, Gray.

102. Darina declivis, Carpenter.

Rept. Brit. Assoc., 1863, p. 637 (August, 1864); and Proc. Zool. Soc. London, 1865, p. 203.

A single shell, measuring 1·77 x ·85 x ·34 inches, was found at

[1] Since the above was written Dr. Dall has published several other papers on North American *Mactridæ*. In one of these entitled "Synopsis of the *Mactridæ* of Northwest America, South to Panama," published in the "Nautilus" for August, 1894, Dr. Dall names the northern species as follows:—

Mactra (Mactrotoma) Californica, Conrad. Fuca Strait to Central America.

Spisula (Hemimactra), polynyma, Stimpson, var. *Alaskana*, Dall. Icy Cape to Neeah Bay.

Spisula (Hemimactra catilliformis, Conrad. Neeah Bay to San Diego.

Spisula (Hemimactra) planulata, Conrad. Monterey to San Diego.

Spisula (Symmorphomactra) falcata, Gould. Comox to San Pedro, Cal.

I have not yet found specimens of the three first named species among our Vancouver shells, nor am I very confident as to the correctness of the identification of the specimens I have recorded above as *S. planulata*.

Vancouver Island by Dr. Forbes, and made the type of this species by Dr. Carpenter.

The latter remarks, in his note on the species, that it "may have been passed over as the young of *Machæra* (*Siliqua*) *patula*, to which it bears a strong external resemblance."

No further specimens seem to have been found.

TRESUS, Gray.

103. Tresus Nuttalli, Conrad.

Lutraria Nuttalli, Conr., Journ. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 235, pl. xviii., fig. 1 (1837).

This is *the* clam of the North Pacific coast. It is very common on all our sandy beaches and is an important article of food among the Indians, who, in summer, collect and dry the animals for winter consumption. A little crab, *Pinnotheres faba*, Dana, finds its lodging within the valves of this shell.

THRACIA, Leach.

104. Thracia curta, Conrad.

Journ. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 248, pl. xix., fig. 8 (1837).

This shell has not yet been found in any numbers, though it seems to be widely distributed.

Dr. Dawson took one specimen in Virago Sound, Queen Charlotte Islands, and a large single valve in Quatsino Sound. Dr. Newcombe has dredged it alive in Clayoquot Sound and at Comox, and I have dredged it alive at Departure Bay and have taken a few dead specimens near Victoria. A valve from the last named locality measured 57 x 46 mm., being a little larger than the one from Quatsino Sound of which Mr. Whiteaves gives the measurements (Trans. R. S. Can. 1886, sec. iv., p. 123).

105. Thracia beringi, Dall, MS.

This species has long been known to Dr. Dall, and though not yet described, I believe, has been distributed under the manuscript name *T. Beringi*.

In 1888, I dredged a large single valve (58 x 43 mm.) and a small number of young living specimens of this species in Departure Bay. These were all submitted to Dr. Dall who kindly determined them for me as above.

LYONSIA, Turton.

106. Lyonsia californica, Conrad.

Journ. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 248, pl. xix., fig. 20 (1837).
= *nitida bracteata*, Gould; (according to Carpenter.)

Common everywhere in sand between tides. I have taken at Victoria an unusually large form which at first I was tempted to treat as a distinct species, but Dr. Dall who kindly examined it considers it to be merely a northern variety of *Californica*.

ENTODESMA, Philippi.

107. Entodesma saxicola, Baird, sp.

Lyonsia saxicola, Baird, Proc. Zool. Soc. London, 1863, p. 70, pl. ii., fig. 14.

Generally distributed; living in crevices of the rocks between tide marks, but not found anywhere in large numbers.

MYTILIMERIA, Conrad.

108. Mytilimeria Nuttalli, Conrad.

Journ. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 247, pl. xix., fig. 5 (1837).

Never yet found by us in any numbers but apparently generally distributed. Living specimens have been taken at the Queen Charlotte Islands and Victoria; dead shells at Comox ("very large" Harvey), Clayoquot Sound and elsewhere.

CUSPIDARIA, Nardo.

109. Cuspidaria pectinata, Carpenter, sp.

Neæra pectinata, Cpr., Rept. Brit. Assoc., 1863, p. 637 (Augt., 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 54.

The generic name *Neæra*, Gray (1834), is said to be preoccupied in Diptera.

C. pectinata is recorded by Carpenter from Puget Sound (1 specimen, Dr. Kennerley). It seems to be quite a common shell with us, having been taken in from 10 to 20 fathoms, in all the localities in which we have dredged. The shells are usually somewhat less than half an inch in length, but Mr. Whiteaves records an extraordinarily large example from Quatsino Sound measuring 21 x 13 mm.

CLIDIOPHORA, Carpenter.

110. Clidiophora punctata, Conrad, sp.

Pandora punctata, Conr., Journ. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 228, pl. xvii., fig. 1 (1837).

Not uncommon in California but only known from this province, at the time of Carpenter's report, by a single valve in Swan's collections. In 1892, however, Mr. E. S. Wilkinson brought dead valves from the west coast of Vancouver Island, and last year Dr. Newcombe found a number of dead shells and also dredged a few living specimens in clean sand in shallow water at Clayoquot Sound.

KENNERLIA, Carpenter.

111. Kennerlia grandis, Dall.

Pandora (Kennerlia) grandis, Dall., Proc. Cal. Acad. Sci., vol. vii. (1877).

Described from Unalashka. First found in British Columbian waters by Richardson in 1875. Afterwards in 1885 by Dr. Dawson, in Duncan Bay and Forward Bay. The only other locality in which it has been taken so far is near Victoria where it is not very rare in 10 to 30 fathoms, sand.

112. Kennerlia filosa, Carpenter.

Rept. Brit. Assoc., 1863, p. 638 (August, 1864); Proc. Zool. Soc. London, 1864, p. 602, and Proc. Acad. Nat. Sci. Phila., 1865, p. 55.

Much commoner than the last and more generally distributed. It has been dredged in 8 to 50 fathoms (sand) in Virago Sound, Queen Charlotte Islands, Quatsino Sound and Straits of Georgia, by Dr. Dawson; in Clayoquot Sound by Dr. Newcombe, and in Departure Bay (where it is common) and at Victoria by myself.

SPHÆNIA, Turton.

113. Sphænia ovoidea, Carpenter.

Rept. Brit. Assoc., 1863, p. 637 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 54.

Described from one living specimen taken by Dr. Kennerley in Puget Sound. I have no knowledge of any further specimens having been taken.

CRYPTOMYA, Conrad.

114. Cryptomya Californica, Conrad, sp.

Sphœnia Californica, Conr., Journ. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 234, pl. xvii., fig. 11 (1837).

A very common shell in this province. It is found on muddy shores between tide marks.

MYA, Linne.

115. Mya truncata, Linne.

Syst. Nat., ed. xii., vol. i., pt. 2, p. 1112, no. 26 (1767).

This common European shell is generally distributed throughout the province. It prefers a muddy rather than a sandy shore and is not confined to the beach but is often found in deep water. It is a common fossil in the Boulder Clay.

Mya præcisa, Gould described from Puget Sound, is said by Carpenter to be a synonym of this species, but other authors refer it to *M. arenaria*. Gould's description would answer well for a young specimen of the latter, the original figure I have not been able to see.

116. Mya arenaria, Linne.

Syst. Nat., ed. xii., vol. i., pt. 2, p. 1112, no. 27 (1767).

This species is a puzzle to me. If it is the *M. præcisa* of Gould, or if as Dr. Newcombe asserts it is a frequent fossil in the Boulder Clay it must of course be considered a native of the province. On the other hand, although I had searched the beaches near Victoria for several years previously, I never found a specimen alive or dead until 1888, in which year I dredged a few specimens of the fry in Departure Bay.

On my return to Victoria in 1890, after an absence of two years, I found *M. arenaria* in thousands in the very spots that I had searched over and over again in previous years and in which it could hardly have existed without my finding it.

So that whether *M. arenaria* is a native or not, I am fully persuaded that the thousands of specimens now living in every sandy shore from Victoria to the northern extremity of Vancouver Island are descendants of specimens introduced within the last few years. There seems to be pretty good evidence that *M. arenaria* was introduced near San Francisco with oysters from Eastern America (for as is well known *M. arenaria* is a very common Atlantic shell), and has multiplied prodigiously, and possibly it has spread up the coast until our province was reached some four or five years ago.

SAXICAVA, Bellevue.

117. Saxicava rugosa, Linne, sp.

Mytilus rugosus, Linne, Syst. Nat., ed. xii., vol. i., pt. 2, p. 1156, no. 249 (1767).
Mya arctica, Linne, op. cit., p. 1113, no. 32 (1767).
Solen minutus, Linne, op. cit., p. 1115, no. 42 (1767).
Mytilus pholadis, Linne, Mant. Plant., p. 548 (1771).

Arctica is the earliest specific name for this shell, but it was applied by Linne to a *variety* while the name *rugosus* was given to the typical rock-boring form. *Pholadis*, a still later name, was given to another variety, which appears to be our commonest form, and this name is the one generally used in recent west coast lists.

This shell is very widely distributed and common in this province, as throughout the world, occurring sometimes nestling at roots of seaweed, sometimes attached by a byssus to the rocks in tide pools and sometimes in the burrows of *Penitella*.

My two finest specimens have been taken in the last named station and measure respectively 55 x 25 x 25 and 48 x 25 x 25 mm. A narrow specimen measures 45 x 14 x 16 mm. These all belong to the variety that has the shell gaping widely in front and to which Jeffreys (Brit. Conch., vol. iii., p. 82) restricts the name *pholadis*.

PANOPÆA, Menard.

118. Panopæa Norvegica, Spengler, sp.

Mya Norvegica, Speng., Skrivt: Nat. Selsk., vol. iii., p. 46, pl. ii., fig. 18 (1793).

This is a rare species both in Europe and in America. In our province it is only known from small dead shells which have been dredged near Victoria by Dr. Newcombe and also by myself.

119. Panopæa generosa, Gould.

Proc. Bost. Soc. Nat. Hist., vol. iii., p. 215, (May 1850); and U. S. Expl. Exped., Mollusca, p. 385, fig. 507-507b (1852).

This large species lives at a considerable depth (more than two feet) in the sand, and consequently is not easily obtained. Moreover it does not appear to be at all common on our coasts. Dead shells have been dredged at Victoria and Comox by Dr. Newcombe and lately that gentleman and Mr. Spreadborough discovered living specimens at Clayoquot Sound. I believe that this species is more abundant in Puget Sound. It also occurs on the Californian coasts.

NETTASTOMELLA, Carpenter.

120. Nettastomella Darwinii, Sowerby, sp.

Pholas Darwinii, Sby.

One specimen was obtained at Vancouver Island by Mr. Lord. The species was originally described as from Chili. It has since been found at Monterey (Rich) and San Diego (Cooper) teste Carpenter.

PENITELLA, Conrad.

121. Penitella penita, Conrad, sp.

Pholas penita, Conr., Jour. Acad. Nat. Sci. Phila., vol. vii., pt. 2, p. 237, pl. xviii, fig. 7 (1837).

Common all round the coast of Vancouver Island, perforating soft rocks between tides. At Vesuvius Bay, Salt Spring Island, I have found very fine specimens measuring more than $3\frac{1}{2}$ inches in length and nearly 6 inches in circumference at the umbones. This species is said by Dall [1] to be found at Bering Island with *Saxirava rugosa* "living in large masses of *Melobesia*, which form accumulations almost like coral on the exposed coasts."

122. Penitella ovoidea, Gould, sp.

Pholas ovoidea, Gould, Proc. Bost. Soc. Nat. Hist., vol. iv., p. 87 (Nov., 1851).

I am not sure that I know this species. It was described from Monterey, and Carpenter in his "Supplementary Report" gives it a southern range. Specimens that I have received from California under this name are indistinguishable from *P. penita*. Mr. Whiteaves in his account of Mr. Richardson's collections says that he collected four living specimens of *P. penita* and four of *P. ovoidea*, near Victoria in 1875. He further says that *penita* has "Siphonal tube wrinkled but not tuberculated" while *ovoidea* has "Siphonal tube tuberculated externally, especially near the middle."

Through the kindness of Mr. Whiteaves one of Richardson's specimens is in my cabinet, but though it manifestly differs from typical *penita* it does not to my mind accord sufficiently well with Gould's description of *ovoidea*.

[1] "Report on the Mollusca of the Commander Islands and Bering Sea, collected by Leonhard Stejneger in 1882-3." Proc. U. S. Nat. Mus., vol. vii. (1884), p. 348-349.

In the same locality with *P. penita* were found: *Mytilusedulis*, *Modiola modiola*, *Cardium blandum*, *Serripes Groenlandicus*, *Tapes staminea*, *Macoma Middendorffi*, *Mactra falcata*, *Siliqua patula*, *Saxicava rugosa*, *Pholas crispata*, *Buccinum Maerchianum*, *Chrysodomus liratus*, *Purpura lima*, *Littorina sitkana*, *Lacuna vincta*, *Acmæa pelta*, *Margarita helicina*, and *Cryptochiton Stelleri*.

Dr. Newcombe informs me that he has lately found on the beach near Victoria a shell which Dr. Dall has determined for him as *Penitella tubifera*, Sby. Tryon has also described *Penitella curvata*, from the Straits of Fuca (Amer. Jour. Conch. vol. i., p. 40, pl. ii., fig. 6, 7 and 8 (1865).

ZIRPILÆA, Leach.

123. Zirphæa crispata, Linne, sp.

Pholas crispata, Linn., Syst. Nat., ed. xii., vol. i., pt. 2. p. 1111, no. 25 (1767).

This species is not uncommon in Europe and on the eastern coasts of America. In the Pacific it is recorded by Carpenter as from Puget Sound (two specimens Dr. Kennerley) and with a query from Swan's collection.

Dr. Dawson found a large worn right valve on the beach north of Cumshewa Harbour, Queen Charlotte Islands, and I found some fine specimens living in sand between tides at Cordova Bay ten years ago, but have never had an opportunity of revisiting that locality and have not been fortunate enough to find specimens anywhere else.

XYLOPHAGA, Turton.

124. Xylophaga dorsalis, Turton, sp.

Teredo dorsalis, Turton, Conch. Dict., p. 185.

Specimens taken by myself in 1888 were I believe the first noted on the Pacific coast of America. They were found living in small pieces of drift wood dredged up in Departure Bay. The shell has since been found near Victoria by Dr. Newcombe.

XYLOTRYA, Leach.

125. Xylotrya bipinnata, Turton, sp.

Teredo bipennata, Turton, Conch. Dict.

126. Xylotrya fimbriata, Jeffreys.

Teredo fimbriata, Jeff., Ann. Mag. Nat. Hist., 1860, p. 126.

Both these *Teredines* are said by Carpenter to occur at Vancouver Island. All the specimens I have taken so far seem to belong to the first named species, but I must admit that I have given but little attention to these shells and have collected very few specimens.

Dr. Newcombe in his catalogue records *X. fimbriata* from Victoria

on my authority, but I am afraid this is a mistake, for which I must apologize, as a re-examination shows that all my specimens are *X. bipinnata*.

SCAPHOPODA.

DENTALIUM, Linne.

127. Dentalium indianorum, Carpenter.

Rept. Brit. Assoc., 1863, p. 648 (August, 1864) = *pretiosum*, Nuttall.

Common in our northern waters though not yet met with on the eastern or southern coasts of Vancouver Island.

Shells of this species were formerly of considerable value as a medium of exchange among the Indians and they are still extensively used by the aborigines for ornamental purposes. Jeffreys supposed this species to be equivalent to the British *D. entale*, Linne.

128. Dentalium rectius, Carpenter.

Rept. Brit. Assoc., 1863, p. 648 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 59.

This species was first found (dead) in Puget Sound by Kennerley, and Carpenter speaks of it as being "very rare." The only British Columbian specimen I have seen or heard of, is the one in the Geological Museum at Ottawa, which was dredged alive by Mr. Richardson, near Victoria in 1875.

CADULUS, Philippi.

129. Cadulus aberrans, Whiteaves.

Trans. Roy. Soc. Canada, 1886, vol. iv., sect. iv., p. 124, fig. 2.

This species was one of Dr. Dawson's discoveries. It was dredged by him in 1885, very abundantly in Forward Inlet, Quatsino Sound, in 10-20 fathoms *mud*.

The shell has not so far as I know been found anywhere else in British Columbia, but Mr. Whiteaves has a note that it has been dredged near the Catalina Islands by Dr. J. G. Cooper.

GASTEROPODA.

PTEROPODA.

It would perhaps have been better to have omitted all mention of this order as no species have been collected by recent observers, but I did not like to omit any name that has had a place on Carpenter's list

and he gives one species of *Pteropoda* as having been collected by Lord in British Columbian waters.

It is a species of wide distribution in the Atlantic as well as the Pacific Ocean and is figured by Dall in pl. lxvi., fig. 113, of Bulletin 37, U. S. Nat. Mus., previously referred to.

Carpenter writes [130] "*Cavolina telemus*, Linne = *Hyalæa tridentata*, Forsk non Lamarck." Dall gives it as *Cavolina tridentata* Forsk. I am not in a position to form any opinion as to whether Linne's older name has reference to the shell in question or not.

OPISTHOBRANCHIATA.

RICTAXIS, Dall.

131. Rictaxis punctocœlata, Carpenter, sp.

Tornatella punctocælata, Cpr., Rept. Brit. Assoc., 1863, p. 646 (Augt., 1864); and Journ. de Conch., vol. xii., p. 139 (April, 1865).

A southern shell only recently detected in our waters. The first native specimens I have seen were dredged by Professor Macoun and myself in Departure Bay last year. I have since heard that large specimens have been found dead on the beach at the north end of Vancouver Island, by Mr. Anderson, and that others have been collected on the east side of Denman Island by Mr. Harvey.

TORNATINA, A. Adams.

132. Tornatina culcitella, Gould, sp.

Bulla (Akera) culcitella, Gould, Bost. Journ. Nat. Hist., vol. vi., no. 3, p. 377, pl. xiv., fig. 8 (Oct., 1853).
\+ *Bulla (Tornatina) cerealis*, Gould, op. cit. p. 378, pl. xiv., fig. 9 (Oct., 1853).
= *Bullina (Tornatina) eximia*, Baird, Proc. Zool. Soc. London, 1863, p. 67, pl. i., fig. 5.

This is the commonest of our three Tornatinas. It seems to abound in about ten fathoms wherever the bottom is sandy. Dr. Dawson obtained it at the Queen Charlotte Islands and in various localities in the Straits of Georgia, Discovery Passage and Queen Charlotte and Quatsino Sounds. Dr. Newcombe has dredged it in Ganges Harbour, Clayoquot Sound and at Comox, Professor Macoun at Sooke—and I have myself found it at Victoria and Departure Bay.

133. Tornatina inculta, Gould.

Bulla (Tornatina) inculta, Gould, Pac. R.R. Rept., vol. v., p. 334, pl. xi., fig. 27-28 (1856).
Tornatina inculta, Gould and Carpenter, Proc. Zool. Soc. London, 1856, p. 203.

The only specimens of this species that have been taken up to the present time in British Columbia were obtained by myself by dredging in Departure Bay in 1888.

134. Tornatina harpa, Dall.

Amer. Jour. Conch., vol. vii., p. 136, pl. xv., fig. 11 (November, 1871).

A single specimen of this little shell was dredged, in about five fathoms, in Clayoquot Sound last September by Dr. Newcombe. It was determined for him by Dr. Dall. *Tornatina harpa* was described from Monterey, California, "Three specimens adhering to the tentaculæ of Actinias."

CYLICHNA, Loven.

135. Cylichna cylindracea, Pennant, sp.

Bulla cylindracea, Penn., Brit. Zool., vol. iv., p. 117, pl. lxx., fig. 85.
var. *attonsa*, Cpr., Rept. Brit. Assoc., 1863, p. 647 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 58.
= *C. propinqua*, E. A. Smith, Ann. Mag. Nat. Hist., series 4, vol. ix., p. 351.

This shell is not very common. It has been recorded from the Straits of Georgia, Quatsino Sound and the Queen Charlotte Islands, by Mr. Whiteaves, under the name *C. alba*. Dr. Newcombe has dredged it at Comox and Clayoquot Sound, Prof. Macoun at Sooke, and I have dredged it in Departure Bay.

I have seen the type of *C. propinqua* which is in the Natural History Museum, South Kensington. It is a fine specimen of *C. attonsa*.

DIAPHANA, Brown.

136. Diaphana pellucida, Brown.[1]

Ill. Recent Conch., pl. xix., fig. 10, 41 (1827).
= *Bulla hyalina*, Turton, Mag. Nat. Hist., vol. vii., p. 353 (1834).
= *Bulla debilis*, Gould, Invert. Mass., ed. i., p. 164, fig. 95 (1841).
etc., etc.

Five immature shells were found by me among roots of kelp washed ashore near Clover Point, Victoria, in 1888. Dr. Dall, to whom these were submitted, referred them doubtfully to *debilis*, Gould.

Lately I have seen a full-grown specimen taken at Sooke by Prof. Macoun, and I find it to accord exactly with the description of *Utriculus hyalina* in Jeffreys's "British Conchology," and also with the figure of Gould's *Bulla debilis* in the "Invertebrata of Massachusetts."

D. pellucida is not a very common species in Euro ean seas. Jeffreys has noted about thirty localities for it on the British coasts, and quotes it also from Norway, Sweden, Iceland and Greenland, and from Madeira and the Canary Islands.

As *debilis* it is on record from Eastern American coasts and it is now recorded I think for the first time from the Pacific Ocean.

[1] I adopt the synonymy of this species as given by Verrill in Proc. U. S. Nat. Mus., 1880, p. 382.

HAMINEA, Leach.

137. Haminea hydatis, Linne, sp.

Bulla hydatis, Linne, Syst. Nat., ed. xii., vol. i., pt. 2, p. 1183, no. 377 (1767). var. vesicula, Gould.

Bulla (Haminea) vesicula, Gould, Pac. R. R. Rept., vol. v., p. 334, pl. xi., fig. 29 (1856).

Haminea vesicula, Gould and Carpenter, Proc. Zool. Soc. London, 1856, p. 203.

Very common indeed among sea grass on sandy shores near low water mark.

NUDIBRANCHIATA.

No attempt is made to enumerate the species of this order inhabiting this province as they have not been systematically collected or studied. Carpenter mentions one species, the common *Chiorœra leonina*, Gould, from Puget Sound and Whiteaves gives this and one other *Dendronotus purpureus*, Bergh, as collected by Dr. Dawson in 1885.

As our species are numerous and many of them large and conspicuous it is hoped that before long some one may be induced to undertake their collection and determination.

PULMONATA.

In order to make this catalogue more complete a list is here given of our British Columbian land and fresh water Pulmonata.

138. Selenites Vancouverensis, Lea, sp.
139. Selenites sportella, Gould, sp.
140. Limax agrestis, Linne.
141. Limax hyperboreus, Westerlund.
142. Vitrina pfeifferi, Newcomb.
143. Hyalina arborea, Say, sp.
144. Hyalina radiatula, Alder, sp.
145. Hyalina milium, Morse, sp.
146. Hyalina binneyana, Morse.
147. Conulus fulvus, Draparnaud, sp.
148. Pristiloma lansingi, Bland, sp.
149. Pristiloma stearnsii, Bland, sp.
150. Ariolimax Columbianus, Gould, sp.
151. Prophysaon hemphilli, Bland & Binney.
152. Prophysaon pacificum, Cockerell.
153. Patula striatella, Anthony, sp.
154. Patula asterisca, Morse.
155. Punctum minutissimum, Lea, sp.
156. Punctum conspectum, Bland, sp.

157. Lysinoe Townsendiana, Lea, sp.
158. Mesodon Columbianus, Lea, sp.
159. Mesodon devius, Gould, sp.
160. Stenotrema germanum, Gould, sp.
161. Pupa corpulenta, Morse, sp.
162. Pupa simplex, Gould.
163. Vertigo ovata, Say.
164. Ferussacia subcylindrica, Linne, sp.
165. Succinea Hawkinsii, Baird.
166. Succinea Nuttalliana, Lea.
167. Succinea Oregonensis, Lea.
168. Succinea rusticana, Gould.
169. Onchidium Carpenteri, W. G. Binney.
170. Onchidella borealis, Dall.
171. Carychium exiguum, Say, sp.
172. Limnæa stagnalis, Linne, sp.
173. Limnæa ampla, Mighels.
174. Limnæa palustris, Müller.
175. Limnæa Adelinæ, Tryon.
176. Limnæa humilis, Say.
177. Limnæa Nuttalliana, Lea.
178. Physa Lordi, Baird.
179. Physa gyrina, Say.
180. Physa ampullacea, Gould.
181. Physa heterostropha, Say, sp.
182. Bulinus hypnorum, Linne, sp.
183. Planorbis ammon, Gould.
184. Planorbis trivolvis, Say.
185. Planorbis bicarinatus, Say.
186. Planorbis opercularis, Gould.
187. Planorbis exacutus, Say.
188. Planorbis parvus, Say.
189. Ancylus caurinus, Cooper.
190. Ancylus fragilis, Tryon.
191. Ancylus kootaniensis, Baird.

SIPHONARIA, Gray.

192. Siphonaria Thersites, Carpenter.

Rept. Brit. Assoc., 1863, p. 647 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xiv., p. 425 (Dec., 1864).

Common on all our coasts near high water mark on rocks and sea-weed. Dr. Dall writes ("Remarks on the genus *Siphonaria*," Amer. Journ. Conch., vol. vi. (1870), p. 30, etc):

"This species having been obtained in latitude 57° N. is probably the most northern representative of the genus."

CTENOBRANCHIATA.

SURCULA, H. & A. Adams.

193. SURCULA PERVERSA, Gabb.

Proc. Cal. Acad. Nat. Sci., 1865.

With the exception of two specimens dredged by Dr. Dawson in Queen Charlotte Sound all the native specimens of this shell that I have seen have been taken near Victoria. In this locality it is not rare, having been dredged in 10 to 20 fathoms, mud, by Richardson, Newcombe, myself and others.

Adult specimens are usually much eroded.

DRILLIA, Gray.

194. DRILLIA INCISA, Carpenter.

Rept. Brit. Assoc., 1863, p. 657 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 62.

Not common. Virago Sound (Dawson), Clayoquot Sound (Newcombe). Dead specimens at Vesuvius Bay, Salt Spring Island, Saanich and Victoria.

195. DRILLIA CANCELLATA, Carpenter.

Rept. Brit. Assoc., 1863, p. 658 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 63.

A rare species. Dr. Kennerley obtained a single specimen in Puget Sound, and a few have been dredged at Victoria and Departure Bay by myself and others, and at Comox by Dr. Newcombe. This species was not represented in any of Dr. Dawson's collections.

BELA, Gray.

Seven species of this genus are on our list, as follows:

196. BELA FIDICULA, Gould, sp.

Fusus fidicula, Gould, Proc. Bost. Soc. Nat. Hist., vol. iii., p. 141 (May, 1849); and U. S. Expl. Exped., Mollusca, p. 233, figs. 284-284*b* (1852).

197. BELA EXCURVATA, Carpenter.

Rept. Brit. Assoc., 1863, p. 658 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 63.

198. Bela Trevelyana, Turton, sp.

Pleurotoma Trevellianum, Turton, Mag. Nat. Hist., vol. vii., p. 351 (1834).

199. Bela exarata, Möller, sp.

Defrancia exarata, Moller, Index Moll. Græl., p. 12 (1842).

200. Bela crebricostata, Carpenter, sp.

Mangilia crebricostata, Cpr., Rept. Brit. Assoc., 1863, p. 658 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 29 (January, 1865).

201. Bela tabulata, Carpenter, Sp.

? *Mangilia tabulata*, Cpr., Rept. Brit. Assoc., 1863, p. 658 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 29 (January, 1865).

202. Bela violacea, Mighels and Adams, sp.

Pleurotoma violacea, M. and Ad., Proc. Bost. Soc. Nat. Hist., vol. i., p. 50 (November, 1841); and Bost. Jour. Nat. Hist., vol. iv., no. i., p. 51, pl. iv., fig. 21 (January, 1842).

The first named, *B. fidicula*, is the common species with us, and represents the European *B. turricula*, Montagu. It is reported from the Queen Charlotte Islands, Queen Charlotte Sound and Johnston Straits (Dawson), and several Vancouver Island localities.

The next three species are very nearly allied to each other.

B. excurvata was described from a single specimen from Puget Sound (Kennerley).

B. Trevelyana is added, by Mr. Whiteaves, on the strength of one dead shell dredged in Virago Sound by Dr. Dawson.

B. exarata is the name given by Dr. Dall to shells from Comox and Victoria sent to him by Dr. Newcombe for determination.

It seems to be just possible that our British Columbian specimens, thus variously determined, may all belong to a single species, namely that intended by Carpenter in his description of *B. excurvata*, which is said to be "like Trevelliana" and which may or may not be equivalent to Möller's earlier *B. exarata*.

B. crebricostata (specimens identified by Dr. Dall) is rare at Victoria and we have not found it elsewhere. The type specimen was collected by Swan.

B. tabulata (specimen also identified by Dall) is from Victoria, but is also on record from Queen Charlotte Sound (two specimens). Mr. Whiteaves, however, in writing of these specimens remarks "perhaps a

variety of *fidicula*" which makes me doubt whether he had genuine *tabulata* before him.

Lastly there is *B. violacea* of which a single living specimen was taken, according to Whiteaves, in Alert Bay by Dr. Dawson.

The two last named species approach in form the next genus and would not be likely to be confused with typical Belas.

MANGILIA, Risso.

We have four species :

203. MANGILIA SCULPTURATA, Dall, sp.

Bela sculpturata, Dall, Proc. U. S. Nat. Mus., vol. ix. (1886); p. 299, pl. iv, fig. 7.

204. MANGILIA ANGULATA, Carpenter.

Rept. Brit. Assoc., 1863, p. 658 (Augt., 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 394 (May, 1865).

205. MANGILIA INTERFOSSA, Carpenter.

Rept. Brit. Assoc., 1863, p. 658 (Augt., 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 29 (Jan. 1865).

206. MANGILIA LEVIDENSIS, Carpenter.

Rept. Brit. Assoc., 1863, p. 658 (Augt., 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 63.
= *funebrale*, Dall, Amer. Journ. Conch., vol. vii., p. 100 (1871), teste Dall, Proc. U. S. Nat. Mus., vol. ix. (1886), p. 299.

The first three of these species are closely related. *M. interfossa* and *angulata* have not been detected here since Carpenter's time but *sculpturata* is common in nearly all the Vancouver Island localities I have examined. It was taken also at the Queen Charlotte Islands by Dr. Dawson. *M. sculpturata* is a rather variable shell and Dr. Dall tells me that northern specimens lack the colour band that is so conspicuous in our shells.

M. levidensis is a beautiful shell quite distinct from and considerably larger than the three last mentioned. It has only been found, recently, by Dr. Newcombe and myself, at Comox and Victoria. The type specimens of *levidensis* and *angulata* were from Puget Sound and of *interfossa* from Neeah Bay.

Dr. Newcombe has a shell apparently of the present genus which Dr. Dall has informed him is probably of an undescribed species. Still another shell which may belong here was described by Mr. E. A. Smith as *Pleurotoma Vancouverensis* (Ann. Mag. Nat. Hist., series 5, vol. vi., p. 286 (1880), but I have not seen the description and do not know the species.

CANCELLARIA, Lamarck.

207. Cancellaria modesta, Carpenter.

Rept. Brit. Assoc., 1863, p. 660 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 32 (January, 1865).

208. Cancellaria Unalashkensis, Dall.

Cancellaria (Trigonostoma) Unalashkensis, Dall, Proc. Cal. Acad. Sci., vol. v., p. 58, pl. ii., fig. 1 (1873).

209. Cancellaria circumcincta, Dall.

Cancellaria (Trigonostoma) circumcincta, Dall, Proc. Cal. Acad. Sci., vol. v., p. 58, pl. ii., fig. 2 (1873).

Here again we have three species very nearly allied, but probably distinct.

C. modesta was described from Swan's collection, and has not been since noticed in this province.

C. Unalashkensis and *circumcincta* were described and figured by Dall,[1] the first from Unalashka, where, he says, *modesta* also was found, and the latter from Popoff Strait, Shumagin Islands.

C. Unalashkensis has since been found at Victoria and Clayoquot Sound by Dr. Newcombe, and *circumcincta* has been dredged by Dawson at Forward Bay, Freshwater Bay and Cullen Harbour, and by myself in Departure Bay, near Nanaimo.

ADMETE, Möller.

210. Admete Couthouyi, Jay, sp.

Cancellaria Couthouyi, Jay, Catalogue, ed. 3, pt. 77 (1839).
= *C. buccinoides*, Couthouy, 1838 *(preoccupied)*,
= *viridula*, Auct., non O. Fab.

This Atlantic species was added to our list by Whiteaves, who records six specimens as having been taken at various points in Queen Charlotte Sound by Dr. Dawson. Dr. Newcombe has since taken a specimen near Victoria. Dr. Dall has pointed out (Proc. U. S. Nat. Mus., ix., 1886, p. 298) that this species is not the *Tritonium viridulum* of O. Fabricius, although it has long gone under that name.

OLIVELLA, Swainson.

211. Olivella biplicata, Sowerby, sp.

Oliva biplicata, G. B. Sby., Tank. Cat., app. xxxiii., no. 2332 (1825).

Very abundant on the north and west coasts of Vancouver Island

[1] "Preliminary Descriptions of New Species of Mollusca from the Coast of Alaska, with notes on some rare forms," Proc. Cal. Acad. Sci., vol. v., pp. 57-62, pl. ii., April, 1873).

in sand between tides, and to a depth of a few fathoms below low-water mark.

212. OLIVELLA BÆTICA, Carpenter.

Rept. Brit. Assoc., 1863, p. 661 (August, 1864).

Very common in shallow water on sandy bottoms. Queen Charlotte Islands, Queen Charlotte Sound and other localities (Dawson); Departure Bay, abundant (G. W. Taylor); Victoria, rare (Newcombe); Clayoquot Sound (Newcombe); Comox (Macoun).

VOLUTELLA, Swainson.

213. VOLUTELLA PYRIFORMIS, Carpenter.

Rept. Brit. Assoc., 1863, p. 661 (August, 1864); and Journ. de Conch., vol. xii., p. 148 (April, 1865).

A common shell usually found under stones, or under seaweed on rocks, near low water mark, but sometimes dredged from deeper water. It occurs from Victoria to the Queen Charlotte Islands. During life the animal is of a bright yellow colour.

MITROMORPHA, A. Adams.

214. MITROMORPHA FILOSA, Carpenter.

? Daphnella filosa, Cpr., Rept. Brit. Assoc., 1863, p. 658 (August, 1864).
Mitromorpha filosa, Cpr., Ann. Mag. Nat. Hist., series 3, vol. xv., p. 182 (March, 1865).

Described from Sta. Barbara and not very rare at several other points on the Californian coast. The only British Columbian specimens I have heard of were three, dredged by Dr. Dawson at the mouth of Cumshewa Harbour in 20 fathoms of water.

215. MITROMORPHA EFFUSA, Carpenter.

? Daphnella effusa, Cpr., Rept. Brit. Assoc., 1863, p. 658 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 29 (January, 1865).

Described from "one broken specimen, Neeah Bay, Swan," a rather slender title I am afraid, to a place on our list.

BUCCINUM, Linne.

216. BUCCINUM POLARE, Gray.

Buccinum polaris, Gray, Zool. Voy. Blossom, p. 128 (1839), var. ? *percrassum*, Dall.

Buccinum percrassum though now thought, by some conchologists, to be a distinct species was described as a variety of *S. polare* and it was

under this name (though most unfortunately as var. *compactum* instead of *percrassum*) that our first British Columbian specimens were recorded.

Under this name (*compactum*) will be found a note of two specimens, dead, found by Mr. Richardson on the beach at Victoria in 1875 and of one specimen, also dead, that was taken by Dr. Dawson off False Head, Vancouver Island, ten years later.

Since that date Dr. Newcombe has dredged three dead specimens off Macauley's point near Victoria, and both the doctor and myself have found fossil specimens in the Boulder Clay.

B. percrassum is not uncommon, living, to the north of us.

217. Buccinum cyaneum, Bruguière.

var. Mœrchianum, Fischer.

Volutoharpa mœrchiana, Fischer, Journ. de Conch., vol. vii., p. 299 (March, 1859).

In 1890 I received from Mr. E. S. Wilkinson, four specimens of this species, that had been picked up by him on the beach at Alert Bay, Vancouver Island. One of the specimens was alive when found, the other three dead. Dr. Newcombe has since found a dead specimen on the shore at Victoria.

My shells were kindly determined for me by Dr. Dall.

CHRYSODOMUS, Swainson.

218. Chrysodomus fornicatus, O. Fabricius, sp.

Tritonium fornicatum, O. Fab., Fauna Grœnl., p. 399 (1780).

The first specimens of this species found here were two dead ones dredged by myself outside Victoria Harbour in 1886. Dr. Newcombe has since dredged a couple of living specimens in the same locality. When fresh the shell is of a dark purplish brown colour, with an olivaceous epidermis.

219. Chrysodomus liratus, Martyn, sp.

Buccinum liratum, Martyn, Univ. Conch., vol. ii., no. 43, pl. xiii. and xiv., fig. 1 (1784).
= *decemcostatus*, Midd., not Say.
= *Middendorffi*, Cooper.

Five living specimens of this species were dredged by Dr. Dawson, in 1885, at Freshwater Bay, near Malcolm Island, and off False Head, all of which localities are in Queen Charlotte Sound.

I have not seen living specimens from any more southerly localities, but Dr. Newcombe has dredged dead specimens near Victoria.

220. Chrysodomus Kennicottii, Dall.

Buccinum Kennicottii, Dall, Amer. Journ. Conch., vol. vii., p. 108, pl. xv., fig. 1 (November, 1871).
Chrysodomus Kennicottii, Dall, Proc. Cal. Acad. Sci., vol. iv., p. 271 (October, 1872).

A single dead specimen was dredged by me in the same place and at the same time as the specimens of *C. fornicatus* mentioned above. The species was described by Dall from Unalashka.

221. Chrysodomus tabulatus, Baird.

Proc. Zool. Soc. London, 1863, p. 66, pl. i., fig. 1.

This is our most abundant species of *Chrysodomus*, though at present we have only found it in the southern parts of the province.

It is dredged quite commonly near Victoria, in 10–20 fathoms.

The dead shells, usually tenanted by large hermit crabs, often contain also beautiful specimens of *Crepidula navicelloides*.

222. Chrysodomus Harfordi, Stearns.

Fusus (? Chrysodomus) Harfordi, Stearns, Proc. Cal. Acad. Sci., vol. v., p. 79 (1873).

The type specimens of *C. Harfordi* were found in Mendocino County, California (Harford) and the Farallones (Watkins). The single example found in British Columbia was taken alive by Dr. Dawson on rocks at low water in Houston-Stewart Channel, Queen Charlotte Islands, and is now in the museum of the Geological Survey at Ottawa. For an extended description of this species, see Dall "On the California species of Fusus," in Proc. Cal. Acad. Sci., vol. vii., 1877.

223. Chrysodomus rectirostris, Carpenter.

Rept. Brit. Assoc., 1863, p. 664 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 64.
=*Sipho angustus*, E. A. Smith, Ann. Mag. Nat. Hist., series 5, vol. vi., p. 287 (1880).

This species was described by Carpenter from a single specimen taken by Kennerley in Puget Sound. The type, which is preserved in the United States National Museum, was not in good condition, and Carpenter's original description will hardly apply to perfect specimens. Hence the species has been redescribed by Mr. E. A. Smith as *Sipho angustus*.

It is not a common shell. Richardson dredged three living specimens near Victoria in 1875, Dr. Newcombe has taken one or more in the same place, and I have a single dead shell also taken near Victoria.

My specimen was compared with Carpenter's type by Dr. Dall and with the type of *angustus* by Mr. E. A. Smith and myself, so that there can be no doubt as to the synonymy.

224. Chrysodomus phœniceus, Dall.

Proc. U. S. Nat. Mus., vol. xiv., p. 187 (1891).

This species was taken by the naturalists of the U. S. Fish Commission steamer Albatross, near Goletas Channel, Queen Charlotte Sound.

225. Chrysodomus Verkruzeni, Kobelt.

One large dead shell belonging to this species was dredged by Dr. Dawson off False Head, Vancouver Island, in about thirty fathoms, this being, according to Mr. Whiteaves, the most southerly locality yet reported for the species.

MOHNIA, Friele.

226. Mohnia Frielei, Dall.

Proc. U. S. Nat. Mus., vol. xiv., p. 187 (1891).

Off north coast of Vancouver Island, 1888 (Albatross).

EUTHRIA, Gray.

227. Euthria dira, Reeve, sp.

Buccinum dirum, Rve., Conch. Icon., Mon. of Bucc., fig. 92 (December, 1846).
= *Fusus incisus*, Gould (1849).
= *Tritonium* (*Fusus*) *sitchense*, Midd. (1849).

A common littoral species, occurring in all localities examined within the province, and ranging northward to Alaska and southward to Monterey.

Specimens of *Crepidula adunca* are commonly found attached to the shells of this species.

NASSA, Lamarck.

228. Nassa fossata, Gould, sp.

Buccinum fossatum, Gould, Proc. Bost. Soc. Nat. Hist., vol. iii., p. 152 (Jan., 1850); and U. S. Expl. Exped., Mollusca, p. 254, fig. 321, 321a (1852).

This species occurs with us only on the west coast of Vancouver Island; it is found from extreme low water to twenty fathoms.

It is a not uncommon Californian shell.

229. Nassa mendica, Gould.

Proc. Bost. Soc. Nat. Hist., vol. iii., p. 155 (January, 1850); and U. S. Expl. Exped., Mollusca, p. 263, figs. 331, 331*a* (1852).

Very abundant and variable. It has been dredged, wherever dredging has been carried on, from the Queen Charlotte Islands to Victoria. A

variety that was named *N. Gibbsii* by W. Cooper is the common form between tides in Esquimalt harbour.

ASTYRIS, H. and A. Adams.

230. ASTYRIS TUBEROSA, Carpenter, sp.

Amycla tuberosa, Cpr., Rept. Brit. Assoc., 1863, p. 662 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 398 (May, 1865).

Dr. Carpenter, on p. 628 of his "Supplementary Report," writes of the present species as "rare" among Swan's Puget Sound and Vancouver Island shells, and on page 662 of the same report he places it in the Vancouver column.

In his description of this species, however, in the Annals and Magazine of Natural History, he makes no mention of any locality for the shell north of Monterey. Perhaps the name should be struck off our lists, for the species does not seem to have been found in the province since Carpenter's time.

231. ASTYRIS CARINATA, Hinds, sp.

Columbella carinata, Hinds, Zool. Voy. Sulph., vol. ii., p. 39, pl. x., figs. 15-16 (1844).
= *C. gausapata*, Gould, 1850.
= *C. Hindsii*, Reeve.

C. gausapata is the northern form of *carinata*. The species is common, and is found between tides or just below low-water mark all through the province. Dr. Newcombe, in his Catalogue, confuses this species with the next, which is, as far as I can see, undoubtedly distinct.

NITIDELLA, Swainson.

232. NITIDELLA GOULDII, Gould and Cpr.

Proc. Zool. Soc., London, 1856, p. 208.

This is a much larger shell than the last named, and is further distinguished by the possession of a thick and rough epidermis. It is generally obtained by dredging in ten to twenty fathoms, and has been taken by myself and others abundantly at Victoria and Departure Bay; also on the west coast of Vancouver Island, by Dr. Newcombe, and in many northern localities by Dr. Dawson.

Tryon included this species in the synonymy of *Astyris carinata*, and Dr. Dall has also expressed the opinion that they belong together. I still think, however, that the species are distinct, as I have seen no approach to an intermediate specimen.

Mr. E. A. Smith has redescribed this shell under the name *Colum-*

bella (*Nitidella*) *Dalli*.[1] I have compared some of our shells with Smith's type and find no difference whatsoever.

AMPHISSA, H. and A. Adams.

233. Amphissa corrugata, Reeve, sp.

Buccinum corrugatum, Rve., Conch. Icon., Mon. of Bucc., no. 110 (February, 1847).

Common both between tides and in deeper water.

The littoral specimens are usually much overgrown with Polyzoa. There is a variety that is smaller than the ordinary form, and which in some respects approaches *A. versicolor*, Dall, and *A. undata*, Cpr. It is, however, I believe, only a variety of *A. corrugata* The specimens recorded by Mr. Whiteaves as *A. versicolor*, from Houston-Stewart Channel and Cumshewa Harbour (Queen Charlotte Islands), should most probably be referred to this form.

TROPHON, De Montfort.

234. Trophon multicostatus, Eschscholtz, sp.

Murex multicostatus, Esch., Zool. Atlas, pt. 2, p. 11, pl. ix., fig. 4 (1829).

I have retained for this species its familiar west coast name, though there is little doubt but that our shell is a form of the European *Trophon clathratus*, Linne, sp. (Syst. Nat., ed. xii., vol. i., pt. 1, p. 1223, no. 563, 1767). The species occurs here in two forms, the ordinary one with the interior of the shell white, and a rarer one with the mouth dark chocolate colour. I have seen a specimen of this form in the Natural History Museum, South Kensington, labelled as a distinct species, but Dr. Dall, who has seen one of my specimens, regards it as merely a variety of *T. multicostatus*. This species occurs not uncommonly at Victoria, and it was taken by Dr. Dawson in Queen Charlotte Sound and Johnston Straits, but not at the Queen Charlotte Islands.

235. Trophon Orpheus, Gould, sp.

Fusus Orpheus, Gould, Proc. Bost. Soc. Nat. Hist., vol. iii., p. 142 (May, 1849); and U. S. Expl. Exped., Mollusca, p. 234, fig. 285-285b (1852).

This species, according to Dr. Newcombe, is the most abundant *Trophon* at Victoria. It has also been taken by Dr. Newcombe at Departure Bay, and possibly by Dr. Dawson in Cumshewa Harbour. Mr. Whiteaves gives it from three localities in Queen Charlotte Sound, but he has evidently confused this species with the next, and I believe all the specimens in Dr. Dawson's collections should be included under *T. Stuarti*.

[1] Annals and Magazine of Natural History, series 5, vol. vi., p. 287 (1880).

236. TROPHON STUARTI, E. A. Smith.

Proc. Zool. Soc. London, 1880, p. 481, pl. xlviii., fig. 6.

This is our largest and finest species of *Trophon*. It is perfectly distinct from *T. Orpheus* and very much larger. The type was dredged by Capt. Vidler near Victoria, and passed into the hands of a London dealer, from whom Mr. Smith obtained it.

It is apparently much rarer than *Orpheus*, and has so far only been found at Victoria by Capt. Vidler, Dr. Newcombe and myself, and by Dr. Dawson at the three localities in Queen Charlotte Sound referred to under the preceding species. Dr. Dawson's specimens were three in number and very fine.

237. TROPHON TENUISCULPTUS, Carpenter.

Ann. Mag. Nat. Hist., series 3, vol. xvii., p. 277 (April, 1866).

Not rare, occurring everywhere from Victoria to the Queen Charlotte Islands in 10–30 fathoms.

This species was described by Carpenter as a Pleistocene fossil from Sta. Barbara, California.

238. TROPHON DALLII, Kobelt.

Mon. of Trophon in Mart. Chem. (neu. ausg.)
T. muriciformis, Dall,[1] Proc. Cal. Acad. Sci., vol. vii. (1877).

Dall's name being preoccupied, it was changed by Kobelt as above.

The species was described from Icy Cape and Bering Sea, but has been dredged near Victoria by Richardson, Newcombe and myself. It seems to be very rare, and only a few specimens in all have as yet been obtained.

Trophon Dallii is well figured in plate iv., figure 6, of volume ix., of the Proceedings of United States National Museum.

OCINEBRA, Leach.

239. OCINEBRA LURIDA, Middendorff, sp.

Tritonium (*Fusus*) *luridum*, Midd., Bull. Acad. Sci. St. Peters., vol. vii., no. 160, p. 244 (1849); Mal. Ross., pt. 2, p. 150, no. 15, pl. iv., figs. 4 and 5 (1849).
= *Vitularia aspera*, Baird, Proc. Zool. Soc. London, 1863, p. 66, pl. i., fig. 2.

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[1] The paper in which this species was first described is entitled "Preliminary description of new species of Mollusks from the northwest coast of America" (Proc. Cal. Acad. Sci., vol. vii., March, 1877). It contains also the original description of another of our shells, *Kennerlia grandis*.

240. Ocinebra interfossa, Carpenter.

Rept. Brit. Assoc., 1863, p. 663 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 64.

Both the above are common littoral shells, occurring all through the province under stones, near low water mark. Both are subject to considerable variation.

CEROSTOMA, Conrad.

241. Cerostoma foliatum, Martyn, sp.

Purpura foliata, Martyn, Univ. Conch., vol. ii., no. 66, pl. xxiv., fig. 1 (1784).
= *Murex foliatus*, Gmelin.
= *M. monodon*, Esch.,
etc., etc.

At extreme low tide on all our rocky coasts.

PURPURA, Bruguière.

242. Purpura crispata, Chemnitz, sp.

Buccinum crispatum, Chem., Mart. Conch. Cab., vol. xi., p. 84, pl. 187, figs. 1802, 1803 (1795).
= *M. lactuca* and *M. ferrugineus*, Esch. (1829).
etc., etc.

243. Purpura lima, Martyn, sp.

Buccinum lima, Mart., Univ. Conch., vol. ii., no. 46, pl. xv., fig. 1 (1784).
= *canaliculata*, Duclos (1832).
= *decemcostata*, Midd. (1849).

244. Purpura saxicola, Valenciennes.

Zool. Voy. Venus, pl. viii., fig. 4 and 4a (1846).

These three species of Purpura are all common on rocks between tides and here at any rate are quite distinct from one another in all their varieties.

From some few localities these shells are absent without any apparent cause. For instance, during three days shore collecting at Nanaimo last year, I did not see a single specimen of either *lima* or *saxicola* and only in one spot a few specimens of *crispata*.

There are conchologists who would place all these species under one name and there are others who would consider even this a synonym of the *Purpura lapillus* of the Atlantic. Many varieties of *P. saxicola* have been honoured with separate names, which however are hardly worth preserving.

SCALA, Humphrey.

245. SCALA INDIANORUM, Carpenter, sp.

Scalaria Indianorum, Cpr., Rept. Brit. Assoc., 1863, p. 660 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 31 (January, 1865).

This species is not very abundant. It has been dredged at Departure Bay, Baynes Sound and Comox, at Discovery Passage, and at the Queen Charlotte Islands, but has not yet been found at Victoria.

The type specimens were from Swan's collections from Neeah Bay.

OPALIA, H. & A. Adams.

246. OPALIA BOREALIS, Carpenter.

Rept. Brit. Assoc., 1863, p. 660 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 31 (January, 1865).

Found by the United States Exploring Expedition in Puget Sound and indicated, but not described, by Gould in *Expl. Exped. Mollusca*, p. 207. The shell was obtained also by Swan at Neeah Bay and Tatooche Island.

In British Columbia I have never found *O. borealis* alive, but have many times received the dead shells from various points on the west coast of Vancouver Island. Dr. Newcombe has been more fortunate than I have and has taken living specimens at Clayoquot Sound. Professor Macoun found a few very large dead specimens at Sooke.

EULIMA, Risso.

247. EULIMA MICANS, Carpenter.

Rept. Brit. Assoc., 1863, p. 659 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 63.

?? = *Turbo politus*, Linn., Syst. Nat., ed. xii, vol. i, pt. 2, p. 1241, no. 653 (1767).

This species is probably, but not certainly, the same as the *E. polita* of Europe. For the present therefore the name applied by Carpenter to the western shell is retained. The species is widely distributed in our seas and in some localities is rather common.

It has been dredged at Victoria, Departure Bay, Comox and Clayoquot and at numerous points in Queen Charlotte Sound, the Straits of Georgia, Johnston Straits and at the Queen Charlotte Islands.

It is usually found in sand at a depth of 10 to 40 fathoms.

248. EULIMA sp.

A second species of *Eulima* is recorded by Whiteaves, under the name "*Eulima incurva*, Renieri = *E. distorta*, Auct," as having been

dredged by Dr. Dawson in the Straits of Georgia, Forward Bay and Alert Bay and as occurring between tides in Discovery Passage and Goletas Channel. I have found specimens of the same shell at Victoria and Departure Bay both between tides and by dredging, and Dr. Newcombe has specimens from Clayoquot Sound:

Renieri I believe only published the *name* without any description, and as our shell does not appear to be the same as the *E. distorta*, Deshayes, of English conchologists, I am not sure that it has at present any proper name.

TURBONILLA, Risso.

249. Turbonilla tridentata, Carpenter, sp.

Chemnitzia tridentata, Cpr., Rept. Brit. Assoc., 1863, p. 659 (August, 1864); and Journ. de Conch., vol. xii., p. 147 (April, 1865).

This species was described from Puget Sound (Kennerley) and from Sta. Barbara, Monterey and San Pedro. It has not been found in our waters by recent collectors.

250. Turbonilla Lordi, E. A. Smith, sp.

Chemnitzia Lordi, E. A. S., Ann. Mag. Nat. Hist., series 5, vol. vi., p. 288 (1880).

A very few specimens of this species have been dredged by Dr. Newcombe and myself in Departure Bay. I have compared some of these with Mr. Smith's types. This is the largest species of *Turbonilla* found in British Columbia.

251. Turbonilla torquata, Gould, sp.

Chemnitzia torquata, Gould, Bost. Journ. Nat. Hist., vol. vi., no. 3, p. 384, pl. xiv., fig. 16 (October, 1853).

= *C. Vancouverensis*, Baird, Proc. Zool. Soc. London, 1863, p. 67, pl. i., fig. 3.

252. Turbonilla chocolata, Carpenter, sp.

Chemnitzia chocolata, Cpr., Rept. Brit. Assoc., 1863, p. 659 (August, 1864); and Proc. Cal. Acad. Nat. Sci., vol. iii. (1866).

These two species are I think equally common. *T. chocolata* has been dredged at Victoria, Departure Bay and Clayoquot Sound. *T. torquata*, at the two first named places and also at Duncan Bay, Forward Bay and Cullen Harbour (Vancouver Island). Doubtless both species will be found in other localities when search is made. In California *T. torquata* is said to occur abundantly on the shells of *Haliotis* (Orcutt).

ODOSTOMIA, Fleming.

253. Odostomia nuciformis, Carpenter, and var. avellana, Carpenter.

Rept. Brit. Assoc., 1863, p. 658 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 30 (January, 1865).

254. Odostomia satura, Carpenter, and var. gouldii, Carpenter.

Rept. Brit. Assoc., 1863, p. 658 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv , p. 30 (January, 1865).

255. Odostomia inflata, Carpenter.

Rept. Brit. Assoc., 1863, p. 658 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 395 (May, 1865).

256. Odostomia tenuisculpta, Carpenter.

Rept. Brit. Assoc., 1863, p. 659 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 30 (January, 1865).

257. Odostomia straminea, Carpenter.

Rept. Brit. Assoc., 1863, p. 659 (August, 1864), and Journ. de Conch., vol. xii., p. 146 (April, 1865).

258. Odostomia Sitkensis, Dall.

259. Odostomia gravida, Gould.

Bost. Journ. Nat. Hist., vol. vi., no. 3, p. 384, pl. xiv., fig. 14 (October, 1853).

The Odostomias of British Columbia have not yet been satisfactorily worked up. Specimens are very common both between tides and among dredged material, and I have accumulated many hundred shells. I have never yet, however, had an opportunity of either critically examining these myself or submitting them to competent authority and therefore cannot write with confidence upon the subject.

Of the seven species enumerated above, two, *O. inflata* and *O. tenuisculpta*, are quoted on the strength of specimens collected by Swan in Puget Sound.

A third, *O. Sitkensis*, is recorded by Whiteaves from the Queen Charlotte Islands and False Bay, Lasqueti Island; this species and *O. straminea* being apparently the only ones met with by Dr. Dawson.

The other four species are in my own collection.

O. satura, or the shell that I think to be this species, is the common large form in Departure Bay.

O. nuciformis, which is the most easily recognized of our species

(from its large size and Tornatelloid shape) occurs rarely under stones at low tide at Victoria, Esquimalt, Salt Spring Island, Nanaimo, etc. I have never found more than one or two specimens of this species together.

O. gravida and *O. straminea* are smaller shells and have been dredged in various localities round Vancouver Island, and a single specimen of the last named was taken at the Queen Charlotte Islands by Dr. Dawson.

There are three or four other forms for which I have not yet been able to find satisfactory names, and I am inclined to the opinion that they belong to undescribed species.

TRITONIUM, Cuvier.

260. Tritonium oregonense, Redfield, sp.

Triton Oregonense, Redf., Ann. Lyc. Nat. Hist. N.Y., vol. iv., no. 5, p. 165, pl. xi., fig. 2a and 2b (1846).
= *T. cancellatum*, Midd. and others, but not of Lamarck.

This species is very common at Victoria from low water mark to twenty or thirty fathoms. The dead shells often contain beautiful specimens of *Crepidula navicelloides*, and on one occasion, as mentioned on page 23 above, I dredged a living specimen with a colony of some twenty or thirty specimens of *T. unguicula* attached to its hairy epidermis.

I have not found this species at Nanaimo, but it appears again further to the north, having been taken by Dr. Dawson both at low water and by dredging in Johnston and Broughton Straits, in Goletas Channel, and at the Queen Charlotte Islands.

Mr. Whiteaves in his paper in these Transactions (vol. iv., 1886), writes that this species is possibly only a local variety of the South American *T. cancellatum*, of Lamarck, but Dr. Dall in the 'Proceedings of the United States National Museum' for the same year[1] (1886, p. 213) has shown that the two species are quite distinct and in their geographical range widely separated.

TRIFORIS, Deshayes.

261. Triforis adversa, Montagu, sp.

Murex adversus, Mont.

This is recorded by Carpenter as being in Swan's Neeah Bay col-

[1] "Contributions to the Natural History of the Commander Islands, No. 6." This paper contains many valuable notes on the northern distribution of our shells. The following species are quoted from Bering Island in addition to others already referred to in note under *Penitella penita* above :—*Pecten Alaskensis? Placunanomia macrochisma*, *Modiolaria laevigata*, *Cuspidaria pectinata*, *Siphonaria Thersites*, *Bela violacea*, *Buccinum percrassum*, *Tritonium Oregonense*, *Natica clausa*, *Acmæa patina*, *Solariella varicosa*, and *Lepidopleurus cancellatus*.

lections. He remarks of this and the next species, "Rare, no differences have been detected on comparing the Herm (British) and Neeah Bay specimens."

T. adversa does not appear to have been noticed here by recent collectors.

Dr. Gwyn Jeffreys considered this species to be equivalent to the Mediterranean form, = *perversum*, Linne, but Forbes and Hanley considered the two to be distinct.

CERITHIOPSIS, Forbes and Hanley.

262. CERITHIOPSIS TUBERCULATA (Montagu) Carpenter.

? *Murex tubercularis*, Mont., Test. Brit., p. 270 (1803).

This is another species from Swan's collection.

Carpenter considered it identical with the English shell, but Jeffreys (Brit. Conch., iv., 268) says that it is not the same. Dr. Dawson took it at Dolomite Narrows and in Virago Sound (at the latter place in 8-15 fathoms), and I have found it under stones at low tide near Victoria.

263. CERITHIOPSIS MUNITA, Carpenter.

Rept. Brit. Assoc., 1863, p. 660 (August, 1864); and Ann. Mag. Nat Hist., series 3, vol. xv., p. 32 (January, 1865).

264. CERITHIOPSIS COLUMNA, Carpenter.

Rept. Brit. Assoc., 1863, p. 660 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 32 (January, 1865).

Both of these species were first found by Swan at Neeah Bay. They are evidently rare with us, a very few specimens only having been found near Victoria.

BITTIUM, Leach.

265. BITTIUM FILOSUM, Gould, sp.

Cerithium filosum, Gould, Proc. Bost. Soc. Nat. Hist., vol. iii., p. 120 (May, 1849); and U. S. Expl. Exped., Mollusca, p. 149, fig. 175,-175c (1852).

Var. *esuriens*, Cpr., Rept. Brit. Assoc., 1863, p. 655 (August, 1864); Ann. Mag. Nat. Hist., series 3, vol. xv., p. 181 (March, 1865); and Journ. de Conch., vol. xii., p. 142 (April, 1865).

Very common everywhere between tides. The common form has the mouth of the shell purplish or chocolate coloured within, but specimens from Clayoquot Sound and a few collected at Salt Spring Island, are pure white.

266. Bittium armillatum, Carpenter.

Rept. Brit. Assoc., 1863, p. 655 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xvii., p. 276 (April, 1866).

Not rare among sponges in rock pools and under stones between tide marks, near Victoria. It is not uncommon in California.

TRICHOTROPIS, Broderip and Sowerby.

267. Trichotropis cancellata, Hinds.

Proc. Zool. Soc., London, 1843, p. 17; and Zool. Voy. Sulph., vol. ii., p. 39, pl. xi., fig. 11 and 12 (1844).

This shell has been dredged not rarely at Victoria, Departure Bay and Comox, in 10-30 fathoms, and at a greater depth. Dr. Dawson procured it at the Queen Charlotte Islands, in the Straits of Georgia, Queen Charlotte Sound, and in most of the localities in which he collected in 1885. Dr. Jeffreys (Brit. Conch., iv., 248) places *T. cancellata* in the synonymy of *T. borealis*, Brod. and Sby.

268. Trichotropis inermis, Hinds.

Proc. Zool. Soc. London, 1843, p. 18; and Zool. Voy. Sulph., vol. ii., p. 40. pl. xi., figs. 13 and 14 (1844).

We have never found any shells that could be referred to this species, which is on our list on the strength of a few specimens collected by Swan at Neeah Bay.

CÆCUM, Fleming.

269. Cæcum crebricinctum, Carpenter.

Rept. Brit. Assoc., 1863, p. 655 (August, 1864); and Proc. Cal. Acad. Sci., vol. iii. (1866).

This little shell has only been once found in British Columbia, and then but a single dead specimen. This was obtained by Dr. Dawson at Dolomite Narrows in 1878.

BIVONIA, Gray.

270. Bivonia compacta, Carpenter.

Rept. Brit. Assoc., 1863, p. 654 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xiv., p. 427 (December, 1864).

B. compacta is generally found upon shells of *Pachypoma inæquale*, and appears to have a range coextensive with that of that species.

Dr. Dawson, however, found it at Discovery Passage on *Trophon tenuisculptus*, and at Quatsino Sound on *Pecten hastatus*.

MESALIA, Gray.

271. Mesalia reticulata, Mighels and Adams, sp.

Turritella reticulata, M. & A., Proc. Bost. Soc. Nat. Hist., vol. i., p. 50 (November, 1841); and Bost. Jour. Nat. Hist., vol. iv., no. 1, p. 50, pl. iv., fig. 19 (January, 1842).
= *T. lactea*, Möller (1842).
= *M. lacteola*, Cpr. (1864).

A very common shell in sand in ten to thirty fathoms. It has been dredged in nearly all the localities where dredging has been carried on, from Victoria to the Queen Charlotte Islands.

LITTORINA, Ferussac.

272. Littorina sitchana, Philippi.

Proc. Zool. Soc. London, 1845, p. 140.

This shell is most probably only a form of the Atlantic *L. rudis*, and if so has an extensive range and also a very extensive synonymy.

It is an abundant and variable littoral shell occurring throughout our province.

273. Littorina scutulata, Gould.

Proc. Bost. Soc. Nat. Hist., vol. iii., p. 83 (March, 1849); and U. S. Expl. Exped., Mollusca, p. 200, figs. 241, 241*a* (1852).

Quite as abundant as *L. sitchana*, and occurring with it on all our coasts.

LACUNA, Turton.

274. Lacuna vincta, Montagu, sp.

Turbo vincta, Mont., Test. Brit., p. 308 (1803).
= *carinata*, Gould.
= *solidula*, Loven.
= *divaricata*, O. Fab.
vars. = *effusa*, *exæquata* and *porrecta*, Cpr.

This is a very variable shell occurring on *Zostera* at low water on all our coasts.

275. Lacuna variegata, Carpenter.

Rept. Brit. Assoc., 1863, p. 656 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xiv., p. 428 (December, 1864).

This species occurs with the last named at Victoria and Saanich, but is not so common as is *L. vincta*.

L. variegata has not been noticed so far in other parts of the province, though no doubt it will be found when more carefully looked for.

ISAPIS, H. & A. Adams.

276. Isapis fenestrata, Carpenter.

Rept. Brit. Assoc., 1863, p. 656 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xiv., p. 429 (December, 1864).

This species was "very rare" in Swan's collection from Neeah Bay. It has not been found since except at Clayoquot Sound, where a few specimens were obtained last year in shallow water by Dr. Newcombe.

ALVANIA, Risso.

277. Alvania compacta, Carpenter, sp.

Rissoa compacta, Cpr., Rept. Brit. Assoc., 1863, p. 656 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 62.

278. Alvania filosa, Carpenter.

Rept. Brit. Assoc., 1863, p. 656 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 28 (January, 1865).

279. Alvania reticulata, Carpenter.

Rept. Brit. Assoc., 1863, p. 656 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xiv., p. 429 (December, 1864).

280. Alvania castanea, Möller, sp.

Rissoa castanea, Möller, Index Moll. Grœnl., p. 9 (1842).

Our four species of *Alvania* are found under stones, or at the bases of sponges, at low water, but from their small size are easily overlooked.

I have found the first three on many occasions at Victoria, Salt Spring Island and Nanaimo.

Dr. Dawson obtained a few specimens of *compacta* and *reticulata* at the Queen Charlotte Islands, the former species at Dolomite Narrows, and the latter in Virago Sound.

A. castanea is known from this province by a single specimen taken by Dr. Newcombe, in Clayoquot Sound. This species seems to be intermediate, as to sculpture, between *A. filosa* and *A. reticulata*.

BARLEEIA, Clark.

281. Barleeia haliotiphila, Carpenter.

Rept. Brit. Assoc., 1863, p. 656 (August, 1864); and Journ. de Conch., vol. xii., p. 144 (April, 1865).

Common among corallines in tide pools near Victoria and probably all along the coast.

The single specimen dredged by Dr. Dawson in Freshwater Bay,

Queen Charlotte Sound, and recorded by Mr. Whiteaves as *B. subtenuis*, was most likely of the present species. *B. subtenuis* is common to the south of us and is distinguished by being wider and altogether much larger than *B. haliotiphila*.

HYDROBIA, Hartmann.

282. HYDROBIA CALIFORNICA, Tryon.

Amer. Journ. Conch., vol. i., p. 221, pl. xxii., fig. 11 (1865).

Very common under stones between tides in brackish water in the Victoria Arm and in Ganges Harbour, Salt Spring Island.

PALUDINELLA, Pfeiffer.

283. PALUDINELLA CASTANEA, Carpenter.

Paludinella sp., Cpr., Rept. Brit. Assoc., 1863, p. 656 (August, 1864).
Paludinella castanea, Cpr., Ann. Mag. Nat. Hist., series 3, vol. xv., p. 28 (January, 1865).

Of this species Swan obtained a single specimen at Neeah Bay.

ASSIMINIA, Leach.

284. ASSIMINIA SUBROTUNDATA, Carpenter.

Rept. Brit. Assoc., 1863, p. 656 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 28 (January, 1865).

This species like the last is known only by the single specimen obtained by Swan at Neeah Bay.

Two freshwater species will follow here,—

285. FLUMINICOLA NUTTALLIANA, Lea., sp.

286. VALVATA VIRENS, Tryon.

GALERUS, Humphrey.

287. GALERUS FASTIGIATUS, Gould, sp.

Calyptræa fastigiata, Gould, Proc. Bost. Soc. Nat. Hist., vol. ii., p. 161 (Aug., 1846); and U. S. Expl. Exped., Mollusca, p. 379, figs. 484-484b (1852).

Very common; attached to stones and dead shells in ten to twenty fathoms all round the coast to the Queen Charlotte Islands. It is probable that our shell is the same as the *Galerus mammillaris*, Broderip.

CREPIDULA, Lamarck.

288. Crepidula dorsata, Broderip, sp.

Calyptræa dorsata, Brod., Proc. Zool. Soc. London, 1834, p. 38; and Trans. Zool. Soc. London, vol. i., p. 202, no. 20, pl. xxviii, fig. 10.

This species is common in several varieties.

Sometimes the shell is internally of a rich purple. This form is usually found on shells of *Ostrea lurida*.

Another variety is white streaked and spotted with brown or sometimes wholly white. This is found attached to shells and stones dredged from deeper water and also occasionally between tides on the under sides of rocks, or on dead bivalves, or in the disused burrows of *Penitella penita*.

289. Crepidula adunca, G. B. Sowerby.

Tankerville Cat., app. vii., no. 828 (1825).

This is a common littoral species. Near Victoria it is generally found attached to shells of *Euthria dira* and *Calliostoma costatum*. On the west coast Dr. Newcombe found its station to be on *Phorcus pulligo*, while in California, according to Orcutt, it is usually attached to shells of *Norrisia norrisii*. Dr. Dawson found *C. adunca* in Queen Charlotte Sound and at the Queen Charlotte Islands.

290. Crepidula navicelloides, Nuttall.

Common and variable. A large rough form beautifully marked inside with green and purple is not uncommon on the rocks at Esquimalt. Another form of a pure white, is found under stones between tides on all our coasts. A third variety occurs in dead bivalves dredged at various depths, and a fourth is in dead Gasteropoda, e.g., *Calliostoma*, *Tritonium*, and many others,

AMALTHEA, Schumacher.

291. Amalthea cranioides, Carpenter, sp.

Hipponyx cranioides, Cpr., Rept. Brit. Assoc., 1863. p. 654 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xiv., p. 427 (December, 1864).

This is a rare shell on the east coast of Vancouver Island but apparently more common on the west, as I have seen many dead shells brought thence by the Indians.

Dr. Dawson found one living specimen at the Queen Charlotte Islands, and I have myself found it, but only once at Victoria.

NATICA, Lamarck.

292. Natica clausa, Broderip and Sowerby.

Zool. Journ., vol. iv., pt. 15, p. 372 (1829); and Zool. Voy. Blossom, p. 136, pl. xxxiv., fig. 3. and pl. xxxvii., fig. 6 (1839).

Not a very common species but found in nearly all localities in which dredging has been carried on.

Most of my specimens were dredged in about twenty fathoms in Departure Bay. The adult shell is nearly unicolorous, but the young are prettily marked with dark stripes. Dr. Newcombe has found this species fossil in the boulder clay.

LUNATIA, Gray.

293. Lunatia Lewisii, Gould, sp.

Natica Lewisii, Gould, Proc. Bost. Soc. Nat. Hist., vol. ii., p. 239 (July, 1847); and U. S. Expl. Exped., Mollusca, p. 211, fig. 253 and 253a (1852).

Common at and above low water mark, burrowing in the sand as the tide recedes. The annular egg ribbons of this species are frequently seen on the beaches and are very puzzling to those who are unacquainted with their true nature.

294. Lunatia pallida, Broderip and Sowerby, sp.

Natica pallida, Br. & Sby., Zool. Journ., vol. iv., pt. 15, p. 372 (1829); and Zool. Voy. Blossom, p. 136, pl. xxxiv, fig. 15 (1839).

= *L. caurina* and *L. soluta*, Gould.

Not rare in ten to forty fathoms at Victoria and Departure Bay. Dr. Newcombe records it from Comox, and Dr. Dawson from Queen Charlotte Sound. This species may easily be distinguished from the young of *L. Lewisii*, by the shape of the whorls and by its much smaller umbilicus.

LAMELLARIA, Montagu.

295. Lamellaria Stearnsii, Dall.

Amer. Journ. Conch., vol. vii, p. 122, pl. xv., figs. 2, 3 and 6 (November, 1871).

= *L. depressa*, Dall, MS. 1866.

I have only two notes of the occurrence of this shell in our waters. One dead specimen was dredged in Houston-Stewart Channel (Q. C. I.), in fifteen to twenty fathoms by Dr. Dawson in 1878, and a second example was obtained by Dr. Newcombe in Clayoquot Sound last summer. The original (type) specimens were found dead on the beach at Monterey.

VELUTINA, Fleming.

296. Velutina lævigata (Linn.) Auct.

This shell has long gone under the above name but, as many authors have pointed out, it cannot be the *Helix lævigata* of Linne [Syst. Nat., ed. xii., vol. 1, pt. 2, p. 1250, no. 709 (1767)] the description of which is quite inapplicable to our shell. Jeffreys (Brit. Conch., vol. iv., p. 242) retains the familiar name but quotes Pennant (Brit. Zool., vol. iv., p. 140, pl. lxxxvi., fig. 139) as the authority, his description and figure being in accord with the shell in question.

Several American conchologists have used the name *haliotoides*, O. Fab., but though the species under consideration is no doubt the *haliotoides* of Fabricius, it is not the *haliotoides* of Müller or of Linne, both earlier in date than Fabricius. (Jeffreys.)

V. lævigata, if we may continue for the present to call it by this name, is not uncommon, attached to stones and shells dredged in ten to thirty fathoms. It has been found at Victoria, Departure Bay, Comox, Clayoquot Sound (Dr. Newcombe) and Discovery Passage (Dr. Dawson.)

297. Velutina prolongata, Carpenter.

Rept. Brit. Assoc., 1863, p. 661 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xv., p. 32 (January, 1865).

This is a rare species. Carpenter described it as rare in Swan's collection and since that time it has only been found in British Columbia by Dr. Newcombe, who took some very large specimens between tides at Victoria and who has found others at the roots of *Macrocystis* at Clayoquot Sound.

V. prolongata has been found, according to Dr. Dall, both to the north and to the south of us, from Sitka to Monterey.

ACMÆA, Eschscholtz.

298. Acmæa patina, Eschscholtz.

Zool. Atlas, pt. 5, p. 19, pl. xxiv, figs. 7, 8 (1833).

Those who wish information as to the rather extensive synonymy of this and other west coast limpets are referred to the papers of Drs. Carpenter [1] and Dall [2] in the American Journal of Conchology; of Dr. Dall [3] in the 'Proceedings of the United States National Museum,' and of Dr. Pilsbry in volume xiii. of the Manual of Conchology.

[1] "On the Acmæidæ of the Vancouver and Californian province" Amer. Journ. Conch., vol. ii, pp. 332-348 (1866).

[2] "On the Limpets; with special reference to the species of the west coast of America, and to a more natural classification of the group." Amer. Journ. Conch., vol. vi., pp. 227-282, pl. xiv. to xvii. (1870).

[3] "Report on the Limpets and Chitons of the Alaskan and Arctic regions with descriptions of genera and species believed to be new." Proc. U. S. Nat. Mus., I. pp. 281-344, 5 plates (1878).

Dr. Dall unites *A. patina* with the Atlantic *A. testudinalis*. of Müller (Prodr. Zool. Dan., p. 237, 1776), but Pilsbry, and with him I agree, considers that as the Pacific shell is in nearly all its variations readily distinguishable from its Atlantic analogue, there is no good purpose to be served by dropping our west coast name.

A. patina is extremely abundant in this province and very variable. I have collected and carefully studied many thousands of specimens and I am not even yet quite satisfied that we are not now erring in uniting forms that are specifically distinct, as we erred before by indulging in excessive subdivisions.

A small deep water variety? of *patina* is no larger than and has somewhat the shape of *A. virginea*. A narrow and compressed variety occurring of leaves of *Zostera* at extreme low tide, seems to represent the Atlantic *A. alveus*, Conrad. Giant specimens found between tide marks sometimes attain a length of nearly three inches.

In nearly all our Vancouver Island localities two forms, very different to each other, exist side by side. The one is large and flat with an open colour pattern, the other more conical, darker in colour and with the markings much more delicate and close. This last is evidently the *A. scutum* of Eschscholtz, and in some of its varieties can hardly be distinguished from the Chilian *A. scutum* of D'Orbigny. Near Victoria it is rare to find a specimen that cannot at once be referred to the one or the other of these two forms.

Dr. Jeffreys (in a paper which I have referred to under *Modiolaria marmorata*) speaks of this species as being very common in Japan, where however I do not think it occurs at all.

The variety *ochracea*, Dall, described from Monterey, is credited to Vancouver Island by Dr. Pilsbry, but I have never seen a native specimen.

299. Acmæa pelta. Eschscholtz.

Zool. Atlas, pt. 5, p. 19, no figure (1833).
\+ *A. cassis*, Esch, Zool. Atlas, pt. 5, p. 19, pl. xxiv, fig. 3 (1833).
etc., etc.

This species is almost as common as *A. patina*. It is very variable but it does not approach the last named in any of its forms. In the adult shells the interior is often entirely white, but there is a curious variety in which the interior is marked with numerous and close raised lines of purplish brown radiating from apex to the edge.

300. Acmæa persona. Eschscholtz.

Zool. Atlas, pt. 5, p. 20, pl. xxiv., figs. 1 and 2 (1833).
\+ *digitalis*, Esch., etc., etc.

This is a smaller species than either *A. patina* or *A. pelta*, and is not quite so common. It is generally found very near high-water mark, and consequently it must spend much of its time out of water.

Californian specimens of *A. persona* are very different in appearance to Vancouver Island ones, and might at first sight be considered as belonging to a distinct species.

The nearest ally of *A. persona* is, to my mind, the *Acmæa dorsuosa*, Gould, from Japan.

Dr. Pilsbry sees a resemblance to *persona* in the Chilian *A. ceciliana*, D'Orb., and has described an intermediate form as *A. subpersona*. I have never seen this last named shell, the figure of which certainly does look like *persona*, but I have examined scores of *A. ceciliana*, and never saw one in the slightest degree approaching our *A. persona*. If Dr. Pilsbry's *A. subpersona* is really a Chilian form, I should certainly be inclined to give it specific rank.

301. Acmæa instabilis, Gould, sp.

Patella instabilis, Gould, Proc. Bost. Soc. Nat. Hist., vol. ii., p. 150 (July, 1846); and U. S. Expl. Exped., Mollusca, p. 346, figs. 454, 454*a* (1852).

This is not a common limpet, and it has so far been found living in British Columbia only on the west coast of Vancouver Island, where it occurs on the stems of *Macrocystis*.

A. instabilis has been considered by some conchologists to be only a kelp form of *A. pelta*, but Dr. Pilsbry with others (myself included) consider this by no means proven.

302. Acmæa mitra, Eschscholtz.

Zool. Atlas, pt. 5, p. 18, pl. xxiii., fig. 4 (1833).

Common at low tide on all our coasts. Often coloured green or pink by encrusting nullipore.

Acmæa scabra, Nuttall, common in California, has been quoted from Vancouver Island, but I have never seen a native specimen, and do not believe that it occurs here.

CRYPTOBRANCHIA, Middendorff.

303. Cryptobranchia concentrica, Middendorff.

Patella caeca, var. *concentrica*, Midd., Bull. Acad. Sci. St. Peters., vol. vi., no. 20, p. 319 (November, 1847).
= *Lepeta caecoides*, Cpr., Rept. British Assoc., 1863, p. 651 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 60.

Not uncommon, attached to stones or dead shells dredged at Victoria, Departure Bay, Comox and Clayoquot. Also off Metlakatla in twenty fathoms, off False Head and in Quatsino Sound (Dr. Dawson).

For notes on the anatomy of this species and its distribution, and

for descriptions of nearly allied forms, see Dall (in Amer. Jour. Conch., vol. v., p. 140 *et seq.*), "Materials for a Monograph of the Family Lepetidæ."

LEPTOTHYRA, Carpenter.

304. Leptothyra Carpenteri, Pilsbry.

= *Leptothyra sanguinea*, Cpr., non Linne.

Not common in the southern part of the province. I have taken it alive between tides at Victoria, and so has Dr. Newcombe, and Prof. Macoun found it in a similar station at Sooke.

Dr. Dawson dredged it in several Queen Charlotte Island localities and also in the Queen Charlotte and Quatsino Sounds. He also found it between tides in Johnston and Broughton Straits, in the Goletas Channel, and on the east side of Queen Charlotte Sound.

It is very common in the little baskets of dead shells that the Indians from northern points bring to Victoria for sale, but I do not know the exact locality whence these are obtained.

305. Leptothyra bacula, Carpenter.

Leptonyx bacula, Cpr., Rept. Brit. Assoc., 1863, p. 652 (August, 1864); and Proc. Cal. Acad. Sci., vol. iii., 1865.

This little shell, which is not rare to the south of us, has not been found in British Columbia except by myself, and I have taken two specimens only, near Victoria.

PACHYPOMA, Gray.

306. Pachypoma inæquale, Martyn, sp.

Trochus inæqualis, Mart., Univ. Conch., vol. i., no 31, pl 8, fig 4 (1784).
= *T. gibberosus*, Chem. (1788).

This is a species which in British Columbia is confined to the north and west. It was reported by Dr. Dawson, "Common on rocks at low water" at the Queen Charlotte Islands; and again, "On rocks and kelp at a little below low-water mark in Quatsino Sound, abundant in some localities." It has been taken also on the west coast of Vancouver Island by Dr. Newcombe and others.

Very often groups of *Bivonia compacta* are attached to specimens of this shell.

The opercula of this species are commonly used by the Indians for ornamenting wooden and other wares.

Dr. Carpenter adopted Chemnitz name, being apparently not quite convinced that our shell was the one described and figured by Martyn and which was said to inhabit the Friendly Islands.

CHLOROSTOMA, Swainson.

307. Chlorostoma funebrale, A. Adams.

Proc. Zool. Soc. London, 1854, p. 316.

This species, like the last named, is confined to our northern and northwestern coasts.

It is not uncommon, where it occurs, and is usually found living at, or just below, low-water mark.

Dr. Dawson found it abundant between Nahwitti Bar and Quatsino Sound. Professor Macoun collected many specimens at Alberni in 1887, and Dr. Newcombe found it at Clayoquot Sound last year.

Dr. Newcombe in his catalogue credits this species to the Queen Charlotte Islands on the authority of Dr. Dawson, but I cannot find the record in any of Mr. Whiteaves's papers on Dr. Dawson's collections.

GIBBULA, Risso.

308. Gibbula pulligo, Martyn, sp.

Trochus pulligo, Mart., Univ. Conch., vol. ii., no. 76, pl. xxvi., fig. 4 (1784).

This is another west coast species with a distribution apparently similar to that of the last named. These shells are most frequently found on the fronds of *Macrocystis pyrifera*.

CALLIOSTOMA, Swainson.

309. Calliostoma annulatum, Martyn, sp.

Trochus annulatus, Mart., Univ. Conch., vol. 1, no. 33, pl. x., fig. 2 (1784).

This species is not very common. Most of the specimens I have seen are from Victoria where the species is dredged in shallow water, and sometimes, though very rarely, is found above low-water mark.

Dr. Dawson found two specimens in Houston-Stewart Channel and a single small one in Forward Bay. I did not obtain this species in Departure Bay nor have I yet seen it from the west coast of Vancouver Island.

310. Calliostoma canaliculatum, Martyn, sp.

Trochus canaliculatus, Martyn, Univ. Conch., vol. i., no. 32, pl. x., fig. 1 (1784).

This species apparently belongs to the west coast of Vancouver Island although it has been dredged near Victoria, on one occasion, by Dr. Newcombe.

Dr. Newcombe has also taken it, alive, at Clayoquot Sound and Dr.

Dawson obtained four specimens in Virago Sound. Like the other west coast *Trochidæ* this species appears to be partial to *Macrocystis*.

311. CALLIOSTOMA COSTATUM, Martyn, sp.

Trochus costatus, Mart., Univ. Conch., vol. i., no. 34, pl. x., fig. 3 (1784).
= *ligatum*, Gould,
&c., &c.

This is our common *Calliostoma* and unlike the two species above mentioned is usually found between tides. The living shell very often has specimens of *Crepidula adunca* attached to it and when dead has not unfrequently *Crepidula navicelloides* within the aperture.

312. CALLIOSTOMA VARIEGATUM, Carpenter.

Rept. Brit. Assoc., 1863, p. 652 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 61.

Dr. Kennerley found one living specimen of this shell in Puget Sound, but I can find no other record of its occurrence in British Columbian waters.

CANTHARIDUS, Montfort.

313. CANTHARIDUS PUPOIDEUS, Carpenter, sp.

Fenella pupoidea, Cpr., Rept. Brit. Assoc., 1863, p. 656 (August, 1864); and Proc. Cal. Acad. Sci., vol. iii. (1865).

This shell which Carpenter placed in *Fenella*, is considered by Dr. Dall to belong to the subgenus *Halistylus* (Dall) of the genus *Cantharidus* (Montfort). It was described from specimens taken near Monterey, California, and was added to our list by Dr. Dawson, who took one adult living specimen at the mouth of Cumshewa Harbour in twenty fathoms.

Last summer Dr. Newcombe took four living specimens, and a few dead ones, at Clayoquot Sound. We have not yet found it on the eastern side of Vancouver Island.

MARGARITA, Leach.

314. MARGARITA HELICINA, O. Fabricius, sp.

Trochus helicinus, O. Fab., Fauna Groenl., p. 393, (1780).

Fine specimens, exactly like European ones, are common between tides in a few spots in the neighbourhood of Victoria, also at Sooke (Macoun). A few specimens were taken by Dr. Dawson at the Queen Charlotte Islands, and in Johnston Strait, and Queen Charlotte Sound.

315. Margarita Vahlii, Möller.

Index Moll. Groenl., p. 8 (1842).

Three specimens, which Carpenter referred with doubt to this species, were collected by Dr. Kennerley in Puget Sound. I have not heard of any other specimens being taken in our waters, the shell recorded by Mr. Whiteaves under this name as having been collected by Mr. Richardson at Victoria, being referable to *Solariella varicosa*.

316. Margarita pupilla, Gould, sp.

Trochus pupillus, Gould, Proc. Bost. Soc. Nat. Hist., iii., p. 91 (March, 1849).
var. = *inflata*, Cpr.

This species is a very abundant one with us. It is found both between tides and down to thirty or forty fathoms, the deep and shallow water forms being constantly distinct.

It occurs all through the province, being one of our commonest shells.

317. Margarita lirulata, Carpenter.

Rept. Brit. Assoc., 1863, p. 653 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 61.

According to Dr. Dall the *Margarita tenuisculpta* of Carpenter and five of the same author's species of *Gibbula*, viz., *obtabilis*, *parcipicta*, *funiculata*, *succincta* and *lacunata*, are all forms of this very variable species. Dr. Dall's opinion was based on the examination of very numerous specimens. In British Columbia *M. lirulata* is very abundant indeed on and under rocks between tides, the commonest form being one answering to the description of *Gibbula succincta*. Specimens dredged are usually of the more brightly coloured and highly sculptured varieties.

SOLARIELLA, Searles Woods.

318. Solariella varicosa, Mighels and Adams, sp.

Margarita varicosa, M. and Ad., Proc. Bost. Soc. Nat. Hist., vol. i., p. 49 (November, 1841); and Bost. Journ. Nat. Hist., vol. iv., no. 1, p. 46, pl. iv., fig. 14 (January, 1842).
= *Trochus* (*Margarita*) *Vancouverensis*, E. A. Smith, Ann. Mag. Nat. Hist., series 5, vol. vi., p. 288 (1880).

This is not a very common shell with us, having only been met with at Victoria and off Pender Island (Newcombe).

Dr. Dall was kind enough to compare my shells with Atlantic specimens and assures me that they exactly correspond. I have myself

compared specimens from Victoria with Mr. Smith's type of *Vancouverensis*, in the Natural History Museum (South Kensington), and found them to agree in every particular.

319. SOLARIELLA PERAMABILIS, Carpenter.

Rept. Brit. Assoc., 1863, p. 653 (August, 1864); and Proc. Cal. Acad. Sci., vol. iii., 1865.

This rare shell was first found at Catalina Island, California, by Dr. Cooper. In our province six fine living specimens were dredged by Dr. Dawson off False Head, Vancouver Island, in thirty fathoms, and one dead shell, in fair condition, was dredged by myself in Departure Bay in 1888.

320. SOLARIELLA CIDARIS, Carpenter, sp.

Margarita cidaris (A. Ads.) Cpr., Rept. Brit. Assoc., 1863, p. 653 (August, 1864); and Ann. Mag. Nat. Hist., series 3, vol. xiv., p. 426 (December, 1864).

Until 1885 this beautiful species was known only by the unique type specimens collected by Swan in Puget Sound. In that year Dr. Dawson dredged a splendid series of twenty-two specimens—in Forward Bay, (eighteen specimens) off False Head, (two specimens) and in Quatsino Sound (two specimens).

This shell has since been obtained by the U.S. Fish Commission in San Pedro Bay.

Mr. Whiteaves has a note on this species and two excellent figures of the largest of Dr. Dawson's specimens, in the "Ottawa Naturalist" for December, 1893 (vol. vii., p. 135).

HALIOTIS, Linne.

321. HALIOTIS KAMTSCHATKANA, Jonas.

Zeitschr. f. Mal., 1845, p. 168.

Not uncommon on boulders at low-water mark on our northern and northwestern coasts. The animal is used as food, by the Indians, and the shell for ornamental purposes. Dr. Pilsbry in his "Manual" places *H. Kamtschatkana* as a variety of *H. gigantea*, Chemnitz (Japan).

PUNCTURELLA, R. T. Lowe.

322. PUNCTURELLA CUCULLATA, Gould, sp.

Rimula cucullata, Gould, Proc. Bost. Soc. Nat. Hist., vol. ii., p. 159 (August, 1846); and U.S. Expl. Exped., Mollusca, p. 368, fig. 475-475c (1852).

323. PUNCTURELLA GALEATA, Gould, sp.

Rimula galeata, Gould, Proc. Bost. Soc. Nat. Hist., vol. ii., p. 159 (August, 1846); and U.S. Expl. Exped., Mollusca, p. 369, pl. xxxi., fig. 476-476a (1852).

324. Puncturella Cooperi, Carpenter.

Rept. Brit. Assoc., 1863, p. 651 (August, 1864); and Proc. Cal. Acad. Sci., vol. iii., p. 214 (1865).

Of our three species of *Puncturella* the two first named seem to be fairly common and they are usually dredged attached to stones or dead shells in ten to thirty or more fathoms.

P. cucullata occurs in two forms, which may possibly prove to be distinct—the one has few and very prominent ribs while in the other the sculpture is closer and much finer.

P. Cooperi is the smallest and rarest of the three, and so far has only been taken in this province, at Departure Bay, where I dredged it in 1888, and again last year, in company with *P. galeata.*

Dr. Pilsbry unites the last named species with the Atlantic *P. noachina*, Linne, sp.

EMARGINULA, Lamarck.

325. Emarginula crassa, J. Sowerby.

Min. Conch., p. 73, pl. xxxiii., upper figures.

The occurrence on our coasts of this rare European shell was hardly expected. The single specimen believed to have been taken at the Queen Charlotte Islands by Dr. Dawson is thus recorded by Mr. Whiteaves in the "Ottawa Naturalist," vol. vii, p. 135: "An adult shell of this species with the animal, was found in a jar containing large specimens of *Solaster Stimpsoni*, *Solaster Dawsoni*, *Cribrella lævisculа* and other starfishes characteristic of the British Columbian marine fauna, preserved in alcohol, the contents of which, except the alcohol, were stated by Dr. Dawson to have been dredged by him at the Queen Charlotte Islands in 1878."

FISSURIDEA, Swainson.

326. Fissuridea aspera, Eschscholtz, sp.

Fissurella aspera, Esch., Zool. Atlas, pt. 5, p. 21, pl. xxiii., fig. 5 (1833).
cratitia, Gould.

Common between tides from Victoria to the Queen Charlotte Islands. A large percentage of the shells of this species are found to contain besides the rightful inhabitant a parasitic annelid—*Lepidonotus Lordi*, Baird. Dr. Newcombe states in his "Catalogue" that he has observed similar worms in the shells of *Puncturella cucullata* and *Acmæa mitra.*

MEGATEBENNUS, Pilsbry.

327. Megatebennus bimaculatus, Dall, sp.

Fissurellidea bimaculata, Dall, Amer. Jour. Conch., vol. vii., p. 132, pl. xv., fig. 7 (November, 1871).

This little shell seems to be very rare in British Columbia. Dr. Dawson dredged two dead specimens in Houston-Stewart channel, Queen Charlotte Islands; Dr. Newcombe found a few specimens living at the roots of *Macrocystis* in Clayoquot Sound; and I have a single dead shell, which I picked up on the beach at Victoria.

POLYPLACOPHORA.

CHITONIDÆ.

The Chitons of the Pacific coast are numerous and very interesting and as a consequence they have received a good deal of attention at the hands of conchologists. Drs. Carpenter, Dall, and Pilsbry, have all written at length upon this subject and it will be sufficient for present purposes for me to refer to their papers[1] and to limit my own remarks to a simple record of the distribution of the various species within our province.

I may say that while there are still some of the smaller forms about which we are in doubt the names of the majority of our Chitons are, I believe, correctly determined. Numerous specimens of all but three of the species admitted to this list are in my own collection.

LEPIDOPLEURUS, Risso.

328. Lepidopleurus cancellatus, Sowerby, sp.

Chiton cancellatus, Sby., Conch. Ill., figs. 104-105 (1839).

This species is of common occurrence under stones between tides and it has also been dredged not unfrequently near Victoria and in Departure Bay, attached to stones and broken pieces of shell. It was also obtained in this way by Dr. Dawson at Alert Bay and Freshwater Bay.

L. cancellatus resembles, very nearly, several other species of the same genus, and I am not quite sure that all our Vancouver specimens really belong to the present species.

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[1] The most important are:–

Carpenter; Supplementary Report to the British Association, 1863.

Dall; Report on the Limpets and Chitons of the Alaska and Arctic regions, &c. (See note under *Acmæa patina*.)

Pilsbry; Manual of Conchology, vol. xiv.

The synonymy of our species will be found exhaustively treated in the two last named works.

TRACHYDERMON, Carpenter.

329. Trachydermon dentiens, Gould, sp.

Chiton dentiens, Gould, Proc. Bost. Soc. Nat. Hist., vol. ii., p. 145 (July, 1846); and U.S. Expl. Exped., Mollusca, p. 321, figs. 433-433b (1852).
=*Trachydermon pseudodentiens*, Cpr.

I have a few specimens of this species found on rocks between tides near Victoria. The shell does not seem to have been recognized by Mr. Whiteaves in Dr. Dawson's collections.

330. Trachydermon flectens, Carpenter.

Rept. Brit. Assoc., 1863, p. 649 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 60.

A pretty little species collected here by both Lord and Kennerley (teste Carpenter). I have taken it not rarely, by dredging, at Victoria and Departure Bay; but strangely enough Dr. Dawson did not obtain it during his northern trips, nor has Dr. Newcombe found it in any of the localities in which he has collected.

TONICELLA, Carpenter.

331. Tonicella lineata, Wood, sp.

Chiton lineatus, Wood, Gen. Conch., p. 15, pl. 2, figs. 4-5 (1815).

Very common between tides on all our coasts. It is a very variable species but always readily separable from its allies. A pretty variety, of which I took two or three specimens at Nanaimo last year, is, when alive, wholly bright blue without any trace of the characteristic lineation. Dr. Pilsbry calls this species "One of the handsomest north Pacific Chitons," and so it undoubtedly is.

332. Tonicella submarmorea, Middendorff, sp.

Chiton submarmoreus, Midd., Bull. Acad. Sci. St. Peters., vol. iv., no. 8 (1846); and Mal. Ross., pt. 1, p. 98, no. 4 (1847).

Of this species only a few specimens have so far been taken at Victoria, Departure Bay and Salt Spring Island (G. W. T.) and Galiano Island (Newcombe).

Carpenter placed *T. submarmorea* on our Vancouver list on the strength of specimens collected by Swan, but added a note "perhaps = *lineata* without the lines." It is however easily distinguished from *lineata*, as Pilsbry remarks, by its microscopic granulations, and from the following species, *T. marmorea*, by its different colour pattern.

333. TONICELLA MARMOREA, O. Fabricius, sp.

Chiton marmoreus, O. Fab., Fauna Groenl., p. 420 (1780).

This is a species that I have searched for, so far, in vain. So far as I know it has only been taken in the Pacific Ocean, near the Aleutian Islands (Dall), and at Japan, and by Dr. Dawson in Houston-Stewart Channel, Queen Charlotte Islands (two specimens).

It is a common species on both sides of the Atlantic Ocean.

CYANOPLAX, Pilsbry.

334. CYANOPLAX HARTWEGII, Carpenter, sp.

Chiton Hartwegii, Cpr., Proc. Zool. Soc. London, 1855, p. 231.

335. CYANOPLAX NUTTALLII, Carpenter, sp.

Chiton Nuttallii, Cpr., Proc. Zool. Soc. London, 1855, p. 231.

C. Nuttallii is recorded from Paget Sound (Swan), and *C. Hartwegii* is said to have been found at the Queen Charlotte Islands by Dr. Dawson. Dr. Pilsbry supposes the two to be forms of one species. My own specimens of *C. Hartwegii* (I have not met with the other form) are from Victoria, but they are not any of them quite like the typical Californian ones.[1]

ISCHNOCHITON, Gray.

336. ISCHNOCHITON INTERSTINCTUS, Gould, sp.

Chiton interstinctus, Gould, U. S. Expl. Exped., Mollusca, p. 322, pl. xxvii., figs. 423-423b (1852).

This beautiful little species is very common on stones and dead shells dredged in ten to thirty fathoms, at Victoria, Departure Bay and elsewhere. Dr. Dawson obtained it in Virago Sound and Houston-Stewart Channel, Queen Charlotte Islands, and in many more southerly localities. Occasionally small specimens may be found under stones between tides.

337. ISCHNOCHITON RETEPOROSUS, Carpenter, sp.

Trachydermon retiporosus, Cpr., Rept. Brit. Assoc., 1863, p. 649 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 59.
= *Leptochiton punctatus*, Whiteaves, Trans. Roy. Soc. Can., vol. iv., sect. iv., p. 125, figs. 3 and 4 (1886).

This is usually found in company with the last species and is

[1] Since the above was written, Dr. Pilsbry has described this form, which occurs also in California, as a distinct species under the name *Trachydermon (Cyanoplax) Raymondi*. Nautilus, vol. viii., p. 46 (August, 1894).

equally abundant. It varies a good deal in colour, as does *I. interstinctus* also, but is usually much darker than that species.

An exceptionally pale specimen was named *Leptochiton punctatus*, by Mr. Whiteaves, under the supposition that it was a new species.

ISCHNORADSIA, Shuttleworth.

338. Ischnoradsia Mertensii, Middendorff, sp.

Chiton Mertensii, Midd., Bull. Acad. Sci. St. Peters., vol. vi., no. 8. p. 118 (April, 1847); and Mal. Ross., pt. 1, p. 125, no. 16, pl. xiv., fig. 1-3 (1847).

This species is found, but not plentifully, in most localities examined from Victoria to the Queen Charlotte Islands.

It is most frequently obtained by dredging, but is sometimes found between tides. Some very large specimens were collected by myself on the rocks at low water at Salt Spring Island.

339. Ischnoradsia trifida, Carpenter, sp.

Trachydermon trifidus, Cpr., Rept. Brit. Assoc., 1863, p. 649 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 60.

The type specimen of this rare species was collected by Dr. Kennerley in Puget Sound. Two specimens were obtained by Dr. Dawson, one at the mouth of Cumshewa Harbour in twenty-nine fathoms, and the other in Queen Charlotte Sound.

Quite lately Dr. Newcombe has found one or two specimens near Victoria. These are all the British Columbian specimens I have heard of, and to the north of us *I. trifida* is equally rare.

NUTTALLINA, Carpenter.

340. Nuttallina scabra, Reeve, sp.

Chiton scabra, Reeve, Conch. Icon., Mon. Chitons, pl. xvii., fig. 106 (1847).

Dr. Kennerley is said to have collected one young living specimen in Puget Sound. Dall gives the distribution of the species as "Vancouver District, south to California, probably in the southern islands of Alaska; at and above high-water mark, in crevices of the rocks; at Monterey abundant."

I have seen numerous Californian specimens but have never found or seen a British Columbian example.

MOPALIA, Gray.

341. Mopalia ciliata, Sowerby, sp.

Chiton ciliatus, Sowerby, Conch. Ill., p. 79, 1838
= *C. muscosus*, Gould, Proc. Bost. Soc. Nat. Hist., vol. ii., p. 145 (July, 1846); and U. S. Expl. Exped., Mollusca, p. 313, fig. 436 (1852).
var. *Hindsii*, Gray, Proc. Zool. Soc. London, 1847, pp. 69 and 169.

342. MOPALIA LIGNOSA, Gould, sp.

Chiton lignosus, Gould, Proc. Bost. Soc. Nat. Hist., vol. ii., p. 142 (July, 1846); + *C. vespertinus*, Gould.

343. MOPALIA WOSSNESSENSKII, Middendorff, sp.

Chiton Wossnessenskii, Midd., Bull. Acad. Sci. St. Peters., vol. vi., no. 8, p. 119 (April, 1847); and Mal. Ross., pt. 1, p. 101, no. 6, pl. xi., fig. 1-2 (1847).

These three forms are all extremely common on rocks between tide marks all through the province.

As found at Victoria and other localities that I have visited the three are always quite distinct. In fact judging only from specimens in my own collection, I should be inclined to admit at least one other form to specific rank.

Dr. Dall on the other hand after the examination of a multitude of specimens places *lignosa* under *ciliata* as a subspecies, thus reducing our Mopalias to two.

Typical *M. ciliata* were not observed by me at Nanaimo last year, although *lignosa* and *Wossnessenskii* were very numerous; usually *ciliata* is the commonest form.

M. Wossnessenskii is very variable in colour ranging from brown to bright red or still brighter emerald green.

PLACIPHORELLA, Carpenter.

Dall suggests (Proc. U.S. Nat. Mus., 1886, p. 210) that *Placiphorella* be retained for the group of *P. velata*, Cpr., and a new subgenus of *Osteochiton* be formed for *P. sinuata* and *P. imporcata*, but for the present we include our three species under the one generic title.

344. PLACIPHORELLA VELATA, Carpenter.

Not rare in California but only known as British Columbian from one fine specimen found last summer by Professor Macoun, on the rocks at Sooke Harbour, Vancouver Island.

345. PLACIPHORELLA SINUATA, Carpenter.

Mopalia sinuata, Cpr., Rept. Brit. Assoc., 1863, p. 648 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 59.

346. PLACIPHORELLA IMPORCATA, Carpenter.

Mopalia imporcata, Cpr., Rept. Brit. Assoc., 1863, p. 648 (August, 1864); and Proc. Acad. Nat. Sci. Phila., 1865, p. 59.

Neither of the above species are common. The former occurs at Victoria in ten to thirty fathoms, and has also been taken by me in some numbers on rocks at low tide in Departure Bay. *P. imporcata*

occurs with *sinuata* at Victoria and has been dredged at Ganges Harbour and Comox by Dr. Newcombe, and in Forward Bay (a single specimen) by Dr. Dawson.

KATHERINA, Gray.

347. Katherina tunicata, Wood, sp.

Chiton tunicatus, Wood, Gen. Conch., pl. ii., fig. 1 (1815).

This is a most abundant chiton on nearly all parts of our coasts. It occurs on the rocks between tides and is collected for food by the Indians and is occasionally seen exposed for sale in the Victoria fish stores.

The only locality in which I have failed so far to find *K. tunicata*, is Nanaimo. During four days collecting there last July, neither Professor Macoun or myself observed a single specimen; *M. ciliata*, as above noted, was also absent.

CRYPTOCHITON, Middendorff.

348. Cryptochiton Stelleri, Middendorff.

Chiton Stelleri, Midd., Bull. Acad. Sci. St. Peters., vol. vi., no. 8, p. 116 (April, 1847); Mal. Ross., pt. 1, p. 37, 93, no. 1, pl. i. to ix. (1847).

This king among chitons is not uncommon in British Columbia, though by no means so plentiful as some others of our species.

It is usually found in the early spring upon the rocks at low water. A large specimen will measure nearly twelve inches in length.

CEPHALOPODA.

OCTOPUS, Lamarck.

349. Octopus punctatus, Gabb.

Proc. Cal. Acad. Nat. Sci., 1862, p. 170.

Carpenter records this species, with a query, as having been collected in Puget Sound by Kennerley, and in the same neighbourhood by Swan, and I suppose that we are correct in applying the name to the large *Octopus* that abounds near Victoria and which is, with the Indians, a much esteemed article of food.

ONYCHOTEUTHIS, Lichtenstein.

350. Onychoteuthis fusiformis, Gabb.

Proc. Cal. Acad. Nat. Sci., 1862, p. 171.

This like the last species is given by Dr. Carpenter, with a query, as from Puget Sound (Kennerley), and I have a single specimen, which

I suppose to belong to this species, and which I found in a dying condition on the beach at Oak Bay near Victoria.

OMMASTREPHES, D'Orbigny.

351. OMMASTREPHES SAGITTATUS, Lamarck, sp.

This appears to be the commonest of our Cephalopods. It was first recorded from our province by Mr. Whiteaves who writes that three specimens were taken at low water in Victoria Harbour by Dr. Dawson. There are numerous fine specimens from various British Columbian localities in the Provincial Museum at Victoria.

Of the species above enumerated, the following are of economic importance, being used as food by the Indians, and also, to a less extent, by the Chinese and whites. Most of them, in their proper season, may be seen exposed for sale in the Victoria stores :

Ostrea lurida,
Mytilus Californianus,
Mytilus edulis,
Cardium Nuttalli,
Tapes staminea,
Saxidomus squalidus,
Macoma secta,
Macoma nasuta,
Macoma inquinata,
Tresus Nuttalli,
Mya arenaria,
Haliotis Kamtschatkana,
Katherina tunicata,
Cryptochiton Stelleri,
Octopus punctatus.

Ostræa Virginica is largely imported, but native specimens of this species are much too scarce to be of commercial value.

Many other of our species are edible, and in other countries would be sought after for food, but their value does not seem to have been discovered as yet by the British Columbians.

The larger Pectens (which I know from personal experience to be exceedingly toothsome, *Penitella penita*, *Siliqua patula*, *Zirphœa crispata*, the *Purpuræ*, the *Littorinæ* and the Limpets, will possibly all some day be utilized.

A large number of our British Columbian Mollusca occur also on the " Old Country " coasts.

* *Hemithyris psittacea*,
* *Limatula subauriculata*,
* *Mytilus edulis*,
* *Modiola modiola*,
* *Modiolaria nigra*,
Modiolaria marmorata,
* *Crenella decussata*,
* *Nucula tenuis*,
* *Leda minuta*,
Kellia suborbicularis,
Lasea rubra,
Cryptodon flexuosus,
* *Mya truncata*,
* *Mya arenaria*,
* *Saxicava rugosa*,
* *Panopaea Norvegica*,

* *Zirphaca crispata*,
* *Xlyophaga drosalis*,
Xylotrya bipinnata,
Xylotrya fimbriata,
Cylichna cylindracea,
* *Diaphana pellucida*,
Haminea hydatis,
Bela Trevelyana,
Triforis adversa,
Cerithiopsis tuberculoris,
* *Lacuna vincta*,
* *Velutina laevigata*,
* *Margarita helicina*,
Emarginula crassa,
Lepidopleurus cancellatus,
* *Tonicella marmorea*.

Many of our land and freshwater shells are also common to the two continents, and a few species, **Macoma lata*, **Natica clausa*, **Admete Couthouyi*, are found in England in a subfossil condition, though still living in our waters.

The foregoing list may be lengthened if we admit the following identifications :—

BRITISH COLUMBIAN.	BRITISH.
Terebratulina unguicula,	*T. caput-serpentis*,
Lucina acutilineata,	*L. borealis*,
Dentalium indianorum,	*D. entale*,
Bela fidicula,	* *B. turricula*,
Purpura crispata,	* *P. lapillus*,
Eulima micans,	*E. polita*,
Eulima, sp.,	*E. distorta*,
Trichotropis cancellata,	* *T. borealis*,
Littorina sitkana,	* *L. rudis*,
Acmæa patina,	* *A. testudinalis*,
Puncturella galeata.	* *P. Noachina*.

The twenty-eight species in the foregoing lists that are marked with asterisks, and the following fifteen species, are known to occur also on the Atlantic coast of Canada :—

Ostrea Virginica
Modiolaria laevigata,
Yoldia thraciæformis,
Yoldia limatula,
Astarte undata,
Serripes Groenlandicus,
Venericardia borealis (= ? ventricosa),
Bela exarata,
Bela violacea,
Buccinum cyaneum,
Chrysodomus liratus,
Trophon clathratus (=? multicostatus),
Mesalia reticulata,
Alvania castanea,
Solariella varicosa.